FOUNDED IN 1856

RAILWAY AGE

THE STANDARD RAILROAD WEEKLY FOR ALMOST A CENTURY

SEPTEMBER 10, 1951

Where does "Roller Freight" cut operating costs?

AT TERMINALS!

Man-hours needed for terminal inspection are reduced 90% when freight trains are mounted on Timken® tapered roller bearings.

IN THE YARDS!

"Roller Freight" makes more cars available because cars get where they are going faster, spend less time in repair shops. Timken journal bearing parts are not displaced by humping operations.

IN THE SHOP!

There are fewer repair jobs needed on draft gear and other parts when freight cars roll on Timken bearings. Timken bearings make it possible to eliminate impact damage from serial starting.

ON THE ROAD!

"Roller Freight" practically eliminates "hot boxes" and the resulting expenses and delays. Timken bearings minimize friction. And there's no waste to "grab".

AT DESTINATIONS!

Timken bearings reduce damage claims by making smoother starts and stops possible. Starting resistance is cut 88%.

ANYWHERE!

Timken bearings cut starting friction to a minimum. You can schedule full-length trains all winter long.

Answer ...all along the line!

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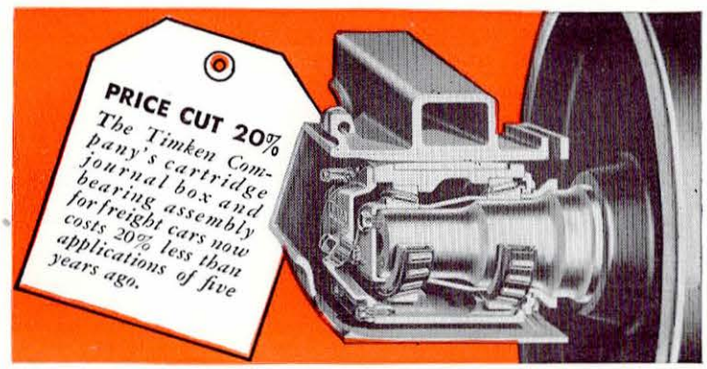
GENEVA COLLEGE

EXTRA SALES ADVANTAGE, TOO! In going after a larger share of tomorrow's freight tonnage, you'll find that "Roller Freight" gives you a big, competitive talking point with shippers. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN TAPERED ROLLER BEARINGS

TRADE-MARK REG. U. S. PAT. OFF.


PRICE CUT 20%
The Timken Company's cartridge journal box and bearing assembly for freight cars now costs 20% less than applications of five years ago.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION ✳

ASSURE YEAR 'ROUND PROTECTION AGAINST HOT BOXES...

...use TEXACO TEXAYCE OIL

Here's an oil that more than meets the stringent new A.A.R. all-year car oil specification — an oil that has been proven by close to a quarter-century of service on leading railroads. *Texaco Texayce Oil* is your best bet to eliminate hot boxes and bring down your maintenance costs.

Texaco Texayce Oil has real stamina. It's made with skilled care from top grade stocks . . . has the low pour point and proper viscosity necessary for year-'round protection. Does away with separate summer and winter grades. Use *Texaco Texayce Oil* for both car and engine journals, oil-lubricated reciprocating parts, and many other friction points.

For Diesel locomotive lubrication, use *Texaco Dieseltex HD.* It's fully detergent and dispersive, has a special heavy-duty additive that steps up resistance to oxidation. Keeps engines clean for low fuel consumption, low maintenance costs.

For traction motor gears, use *Texaco Crater.* Its tough, protective film gives longer lasting protection . . . keeps wear to an irreducible minimum.

Let a Texaco representative tell you in detail about these and other cost-saving Texaco Lubricants and Texaco's unique Systematic Engineering Service. Just call the nearest Railway Sales office listed below, or write The Texas Company, *Railway Sales Division,* 135 East 42nd Street New York 17, N. Y.

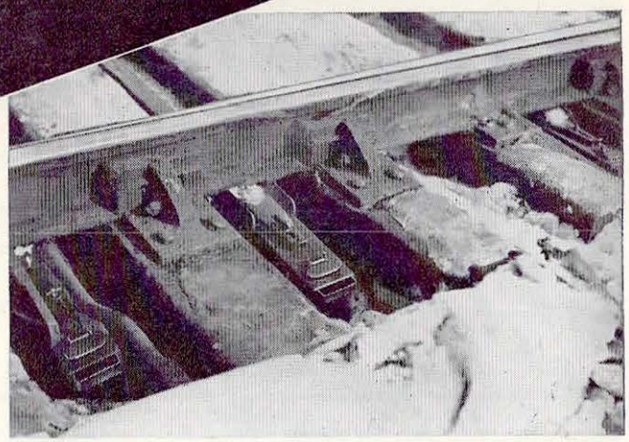
NEW YORK ★ CHICAGO ★ SAN FRANCISCO ★ ST. PAUL ★ ST. LOUIS ★ ATLANTA

TEXACO

TEXACO Texayce Oil

ALL-YEAR CAR AND ENGINE OIL

AVOID FREEZE-UPS WITH Winter Kings



One of the best ways to beat freeze-ups at switches and slips is to install Bethlehem Winter Kings. These low-cost heaters fight snow as it falls, melting it so quickly that dangerous layers of ice have no chance to get a foothold.

The Winter King fits easily between ties so that its heat can be applied directly beneath rail and switch point. The flame is shielded on both sides to prevent scorching of ties and to protect against wind. It stays alive even in strong gusts and storms of blizzard proportions.

Note the sliding cover on top of the housing—a simple device for controlling the flame. Merely loosen the nut and move the cover backward or forward. This easy adjustment permits a bigger flame or cuts it down to almost nothing, as you prefer.

Winter Kings use inexpensive kerosene, and one filling will last for many hours of constant burning. Fuel can be added while the heater is in full operation.

Now is a good time to install Winter Kings . . . before the big snows arrive. You'll find these heaters easy to maintain and economical both in first cost and on the job. Order soon and avoid the seasonal rush.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Congratulations MISSOURI PACIFIC

Our sincere congratulations to the Missouri Pacific on the occasion of its hundredth anniversary. Hyatt pays tribute to a railroad which has made a magnificent contribution to the expansion and development of the southwest and west.

Hyatt is proud to have played a part in the progress of the Missouri Pacific by supplying roller bearing journal boxes for many of its better trains and for its diesel locomotives.

We look forward to a continued association with the Missouri Pacific as a supplier of roller bearing journal boxes during the years ahead. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARING JOURNAL BOXES

Vol. 131, No. 11 September 10, 1951

RAILWAY AGE

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IN THIS ISSUE

EDITORIAL COMMENT:

How Can Suppliers Aid the Railroads Politically? 31
"We Had a Building" 32
High Cost of Impact 32
Brake System Leakage Is Causing Costly Delays 33

GENERAL ARTICLES:

What! Offices Without Windows? 38
Successful Wartime Railroad Management, by Duncan S. Ballantine 42
How the B. & M. Eliminated 22 Miles of Second Track 47
1950 Railroad Construction Indices 50
British Railways Build 2,000-Hp. Diesel-Mechanical Locomotive, by E. C. Poultney 51

NEWS FEATURES:

R.B.A. Survey Shows Vigorous Opposition to Nationalization 34
Canada Appoints "Bulk Transport" Controller 35
"The Song of Mid-America" 36
Net Income for 1951 Reaches $272 Million 37
The Kaw River Rages Again 55
Coordinated Mechanical Associations Programs 58

DEPARTMENTS:

News of the Railroad World 34
Current Publications 74
Freight Operating Statistics 78

Published by SIMMONS-BOARDMAN PUBLISHING CORPORATION, New York 7

Railway Age Railway Mechanical & Electrical Engineer Railway Engineering & Maintenance
Railway Signaling & Communications Car Builders' Cyclopedia Locomotive Cyclopedia
Railway Engineering & Maintenance Cyclopedia American Builder
Marine Engineering & Shipping Review Marine Catalog & Buyers' Directory
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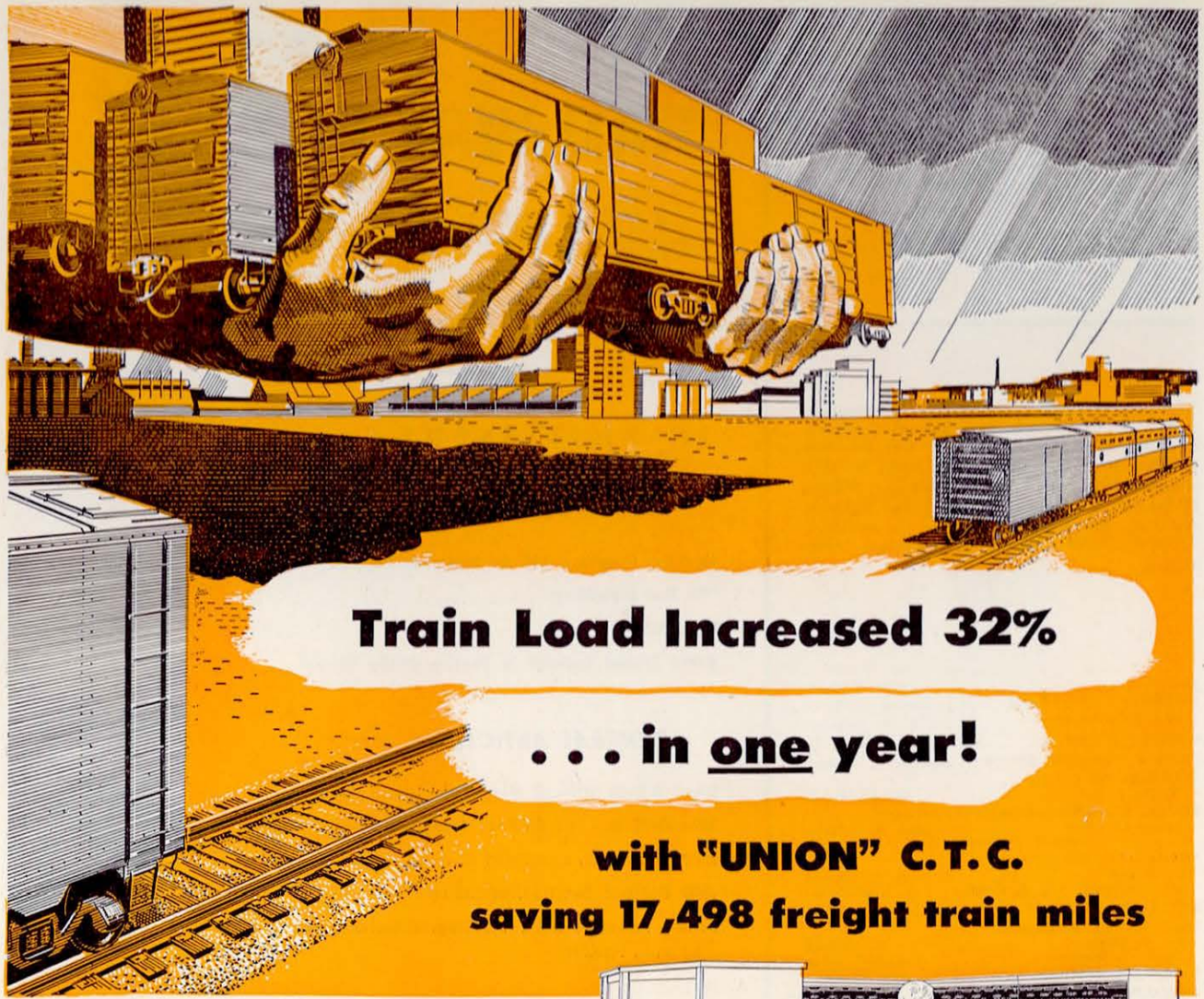


Train Load Increased 32%

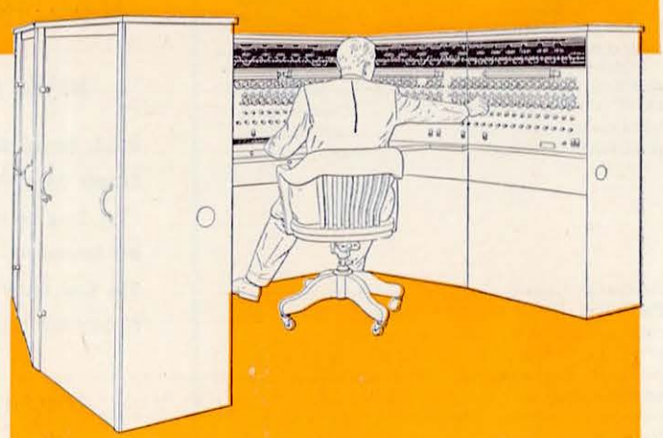
. . . in one year!

with "UNION" C.T.C. saving 17,498 freight train miles

HERE'S THE RECORD*

1. Reduced road time of through freight trains by 648 hours per year.
2. The tonnage of through freight trains was increased 32%.
3. Saved 17,498 freight train miles per year.
4. Saved 2,190 car days per year.
5. Eliminated two sidings and 5 main track switches.
6. Reduced cost of directing train movements.
7. Reduced annual operating expenses.
8. Increased capacity of line for future traffic.
9. Annual return over 3% interest:
   On Capital Investment—21.5%
   On Total Cost —19.9%

*Factual data will be supplied on request.



"UNION" Centralized Traffic Control can reduce terminal-to-terminal time with safety and pay its way through reductions in operating expenses. May we help you?

UNION SWITCH & SIGNAL

DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY

SWISSVALE, PENNSYLVANIA

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WEEK AT A GLANCE

CURRENT RAILWAY STATISTICS

Operating revenues, seven months
1951 ..... $ 5,852,688,158
1950 4,995,868,031

Operating expenses, seven months
1951 ..... $ 4,659,130,003
1950 3,933,258,106

Taxes, seven months
1951 ..... $ 643,599,245
1950 527,361,340

Net railway operating income, seven months
1951 ..... $ 430,439,242
1950 431,815,948

Net income, estimated, seven months
1951 ..... $ 272,000,000
1950 273,000,000

Average price railroad stocks
September 4, 1951 ..... 53.64
September 5, 1950 ..... 45.98

Car loadings, revenue freight
34 weeks, 1951 26,200,254
34 weeks, 1950 24,278,196

Average daily freight car surplus
Week ended August 25, 1951 ... 4,354
Week ended August 26, 1950 ... 4,371

Average daily freight car shortage
Week ended August 25, 1951 ... 17,852
Week ended August 26, 1950 ... 39,477

Freight cars delivered
July 1951 5,290
July 1950 3,464

Freight cars on order
August 1, 1951 144,810
August 1, 1950 67,084

Freight cars, held for repairs
August 1, 1951 101,001
August 1, 1950 129,097

Average number railroad employees
Mid-July 1951 1,294,525
Mid-July 1950 1,247,987

Net Ton-Miles per Serviceable Car per Day
June 1951 (preliminary) 1,035
June 1950 997

In This Issue . . .

INDISPENSABLE PART: Whether we like it or not, both the past and the present are forcing all Americans to learn to live in an economy which is frequently in, or on the verge of, armed conflict. That is especially true of railroad men, because their business, more than most, is an integral part of the country's total military force. Study of the past, i.e., of the successful operation of the railroads in World War II, is an indispensable part of planning for similar successful operation in comparable future emergencies. A thorough study of railroad administration in World War II has been made by Prof. Duncan S. Ballantine of M. I. T., and with his permission is reproduced in somewhat condensed form, beginning on page 42.

WINDOWLESS OFFICE BUILDING: Even in these days of air conditioning and artificial lighting, office buildings almost totally devoid of windows are certainly the exception rather than the rule. But why not be an exception, when it means fine new facilities at low first cost, and with the promise of low future costs as well? That may or may not have been how the T.P.&W. reasoned, but what it is getting in its new Peoria headquarters is told in words and pictures on pages 38-41.

WEEK'S NEWS: Long Island announces $14 million improvement program, including, however, some locomotives and safety installations previously reported.—B. & M. takes another big step toward full dieselization, with orders to Alco-G. E. and E.-M. D. for 39 new units.—R. B. A. canvass of business organizations shows strong opposition to any nationalization of U. S. railroads.—Programs for Coordinated Mechanical Associations' meetings.—Midwestern roads prepare for possible repetition of July floods on Kaw river.—Hicks succeeds Walther as carrier member of N. R. A. B.—Jersey Central announces new p. u. & d. service out of Elizabethport.

LESS DOUBLE TRACK: How the Boston & Maine used centralized traffic control to reduce 22 miles of its busy 34-mile Nashua-Manchester line from double track to single—obtaining, in the process, a substantial amount of usable track material and permanent maintenance savings—is told in the illustrated feature article on page 47.

DIESEL-MECHANICAL LOCOMOTIVE: Virtually without exception, diesel locomotives on American railroads have electric drives. But the British Railways are experimenting with a diesel-mechanical locomotive developing 2,000 horsepower. It is described and illustrated, and its machinery diagrammed, in the article which begins on page 51.

WEEK AT A GLANCE

In Washington . . .

WEIGHT OF EVIDENCE: Each new report of monthly earnings adds to the already overwhelming weight of evidence concerning the frightening impact on the railroads of recent wage and cost increases. Seven-month figures, just released and summarized in the news columns, shown N. R. O. I. and net income *both* actually *less* than for the corresponding seven months of 1950, despite a substantial increase (17.2 per cent) in gross revenues. And for July alone, net was *less than one-third* as large, and N. R. O. I. less than one-half as large, as in July of last year, despite a 5.7 per cent jump in gross for the month.

ON THE WASHINGTON SCENE: Aside from the reports of July and seven months' earnings and settlement of the Pullman-Standard strike, Washington, railroad-wise, was comparatively quiet last week—thanks largely, of course, to the Labor Day holiday. The O.P.S. opposed as "inflationary" increased p.u.&d. charges proposed by eastern railroads; barge builders shouted for more steel; an I.C.C. examiner recommended approval of the G.M.&O.'s plan for a new entrance, via L.&N. trackage rights, into Birmingham, Ala.; and the Department of Justice is fussing again about railroad rates.

. . . And Elsewhere

LOCOMOTIVES AND TANKS: The versatility and productive capacity of American heavy industry have seldom been better exemplified than by the American Locomotive Company's present ability to continue its full normal production of diesel locomotives while at the same time assembling quantities of the Army's newest medium tanks—the first of the improved "General Patton" models to be produced by a private company. For the latter job, Alco has a modern ordnance plant at Schenectady, entirely separate from its locomotive production facilities. It also has a big new tank shipping and testing center on what was once a golf course on the city's outskirts.

ARE THESE CONCLUSIONS CORRECT? Our reading of the newspapers inclines us to some tentative conclusions about the highway trailer or semi-trailer truck, viz.: (1) that such vehicles seem to get into accidents out of all proportion to the number on the highways; and (2) that accidents involving these trucks, on the average, are much worse in property damage, traffic tie-ups and human casualties. We have been told—this being only hearsay, of course—that truck drivers do not like the things because of the difficulty of controlling them. Any evidence our readers may have, either to confirm or refute these growing suspicions, will be welcomed. If there is something inherent in this particular type of vehicle which makes it disproportionately hazardous in operation, then the public interest would be served in making that fact generally known.

ONE MILLIONTH AUTO DEATH: Sometime in December, the National Safety Council says, the millionth American citizen will die in an auto traffic accident. It has taken 50 years for the automobile to kill its first million victims. The council warns, however, that unless national apathy can be cracked, the two-millionth victim will fall within the next 30 years. This a pretty somber warning and one which should be considered carefully by every railroad man and woman who drives a car.

ROY WILFRED MILNER has, as reported in the news pages, just been appointed by the Canadian government to the newly created post of transport controller. Mr. Milner and his deputy, W. Jackson Fisher, will have authority to determine priority of movement to be given to grain or other bulk commodities and to make orders and issue directions accordingly. Their powers apply only to movement of bulk commodities, but cover railway facilities and certain Canadian steamships and storage facilities.

NATIONAL RUBBER-CUSHIONED DRAFT GEARS

cushion the ride behind 9 out of 10 heavy diesels

TYPE M-380

In National Rubber-Cushioned Type M-380 Draft Gear two pairs of rubber pads cushion loads well beyond 500,000 lbs.

THE National Rubber-Cushioned Type M-380 Draft Gear shown here cushions the ride behind 9 out of 10 heavy diesel and electric locomotives. Here are some of its basic advantages:

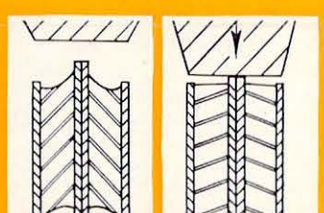
Does Not Creep under sustained loads.

Reserve Dynamic Capacity—For the best combination of soft riding action and high shock absorption, dynamic capacity of a gear must be greater than its static capacity. The dynamic capacity of the National Type M-380 Gear actually increases with shock severity.

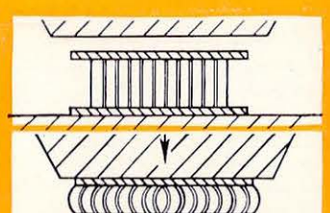
Durability—The Type M-380 Gear gives outstanding service for years. Rugged construction and simple design assure a gear with longer life, greater efficiency.

For more information on National Rubber-Cushioned Draft Gears, write for Circular No. 5047, National Malleable & Steel Castings Co. A-4258

Basic unit in National Type M-380 Draft Gears is this rubber pad bonded between steel plates. It cushions the load in two important ways.



Shear loading, which applies force to the edges of each of the two plates, is highly responsive to light shocks . . . like a long-travel, low-capacity spring.



Compression loading permits much greater loads than the same quantity of rubber in shear . . . comparable to a high-capacity, short-travel spring.

Combination loading of National Type M-380 Draft Gears combines sensitiveness of shear loading with capacity of compression loading.

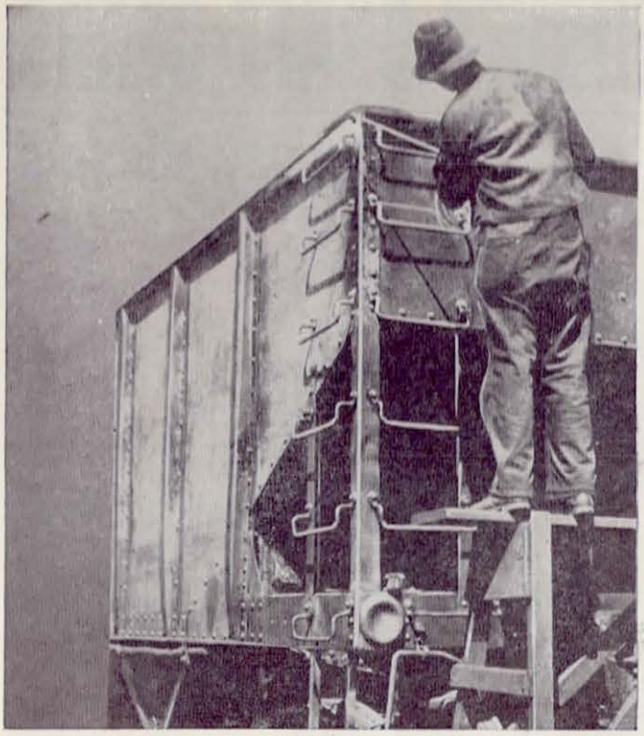
NATIONAL Products FOR TRANSPORTATION AND INDUSTRY

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

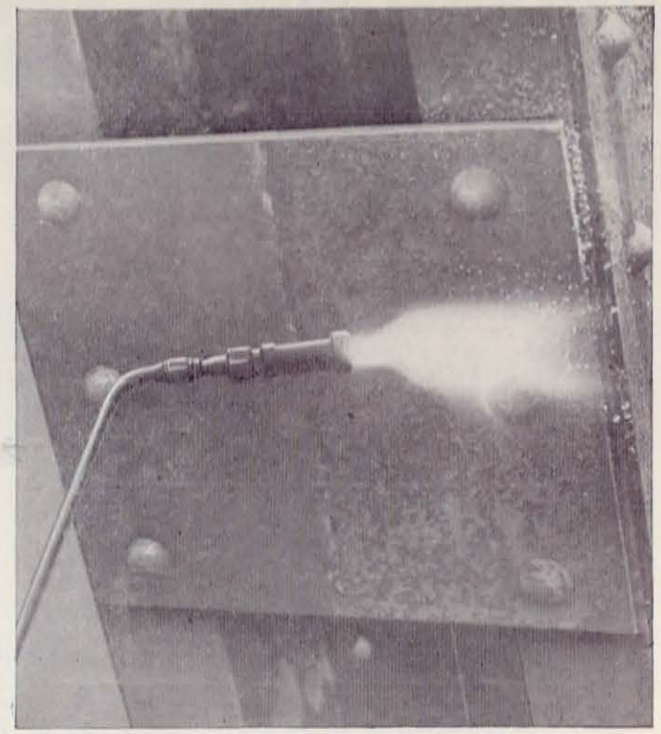
Cleveland 6, Ohio

COUPLERS • TRUCKS • YOKES • DRAFT GEARS • JOURNAL BOXES AND LIDS

Est. 1868



END POST . . . Here, a style 738 Round Bent Tip is used to flame clean the end post of a freight car. This multi-flame tip is ideal for removing scale from corners and around rivets.



BATTEN PLATE . . . on a railroad bridge being flame cleaned with Airco torch. Notice how smooth and clean one half of the plate is . . . how old paint and rust flakes have been completely removed.

flame cleaning

CARS . . . BRIDGES . . . STEEL STRUCTURES CUTS PAINTING PREPARATION COSTS AS MUCH AS 50%

For speed and effectiveness, no other method of preparing steel surfaces for painting comes close to the flame cleaning process. Cost studies made by several leading railroads show that, compared to laborious hand scraping and chipping, cleaning costs are cut by as much as *one-half!*

This Airco process is also used to condition new steel before applying prime coats. Mill scale is loosened and corrosion-starting dirt and moisture eliminated. Surfaces thus prepared reduce costs of future maintenance.

Airco's wide variety of special multi-flame tips make it possible to clean surfaces of practically every contour and size. Learn how you can save with fast, economical oxy-acetylene flame cleaning — get in touch with your local Airco office today.

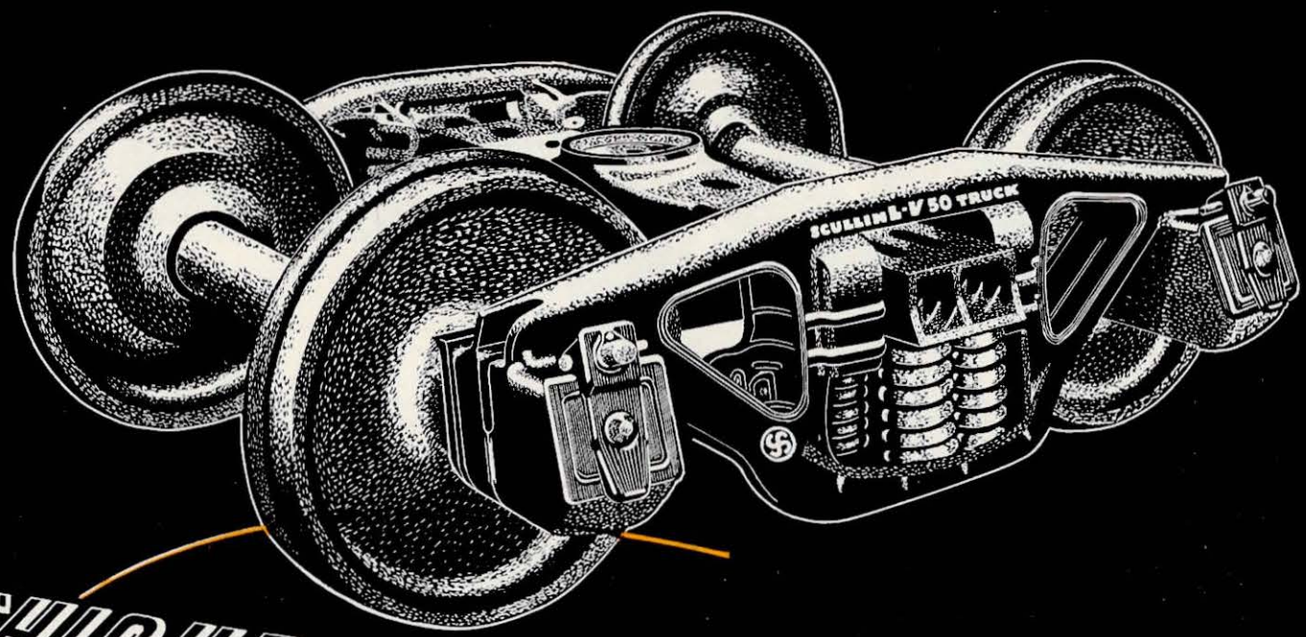
BEAM FLANGE of a pit-installed track scale is Airco flame-cleaned prior to painting. Using an Airco Style No. 120 Tip, this oxyacetylene process is equally adaptable for cleaning water towers . . . signalling equipment . . . in fact, any type of steel railway structure.

Costs come down under the Airco plan

AIRCO

AIR REDUCTION

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities



"HIGHBALL!"

you're sure high speeds are safe on **SCULLIN** LATERAL VERTICAL L 50 V CUSHIONED MOTION **TRUCKS**

THE SMOOTHEST TRAFFIC-BUILDERS BETWEEN LCL AND YOUR RAILS

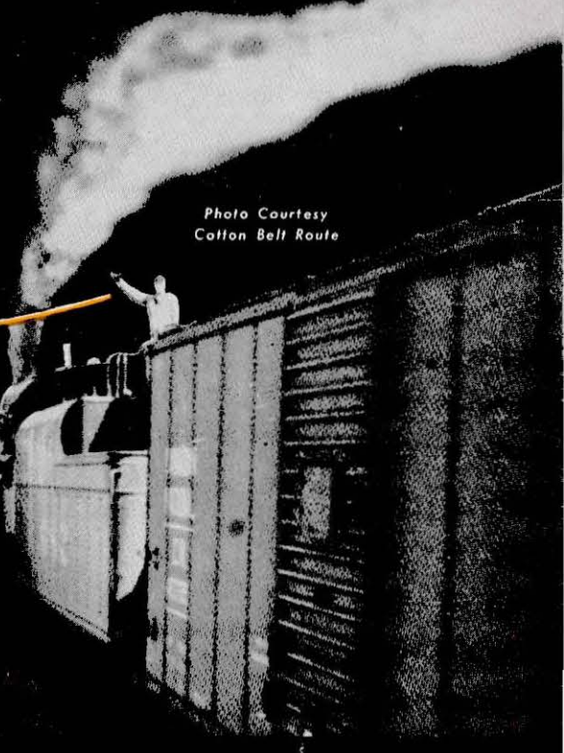


Photo Courtesy Cotton Belt Route

STEEL CASTINGS MANUFACTURER

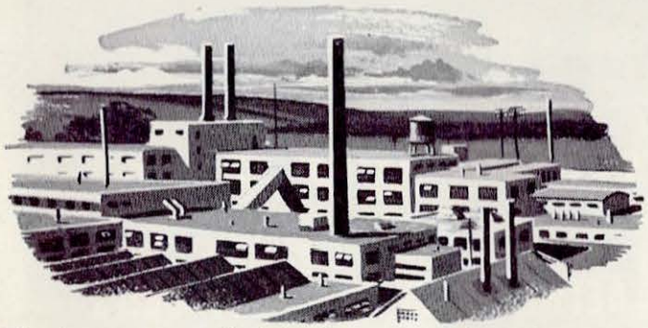
NEW YORK
CHICAGO
BALTIMORE
RICHMOND, VA.

SCULLIN STEEL CO.

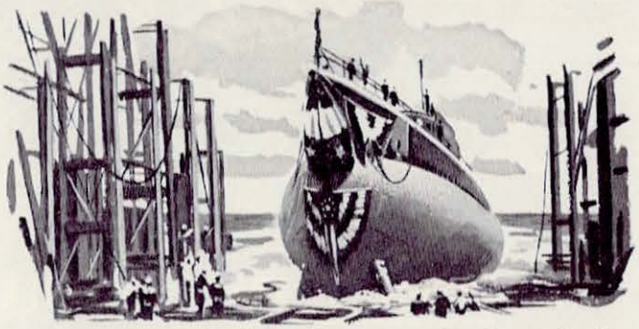
SAINT LOUIS 10, MISSOURI

From one Main Street to another the story's the same! Actually almost everything this country produces requires coal—coal to make steel, to run factories and railroads, to generate immense quantities of electric power, to heat stores, hospitals, apartments. And perhaps *your home* is one of the 14 million that rely on the steady, healthful heat that bituminous coal provides!

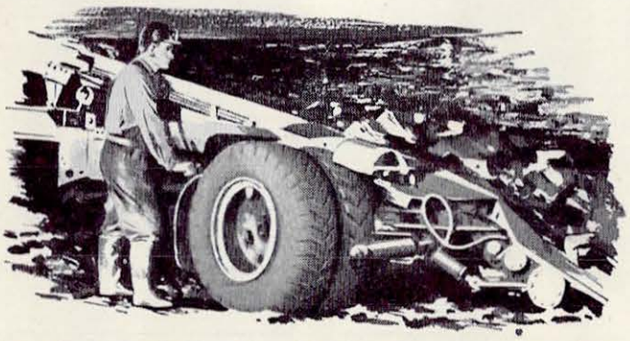
From East Side to West Side... your town takes a lot of Coal!



This factory is typical of the thousands of plants that turn out everything America needs. It gets its power from coal—America's #1 steam fuel—for coal is practically everywhere the most economical power source. And today, automatic controls, automatic coal and ash handling apparatus net even larger savings—minimize dramatically the inconveniences associated with older installations.



From periscope to keel it took 800 *tons* of coal to make the steel that went into this submarine! Today more and more coal is needed for national defense. However, thanks to America's vast coal reserves and the great degree of mechanization that progressive mine operators have developed in mining and preparing coal—*rearmament will get all the coal required without any pinch on the home front!*



Highly developed machines like the giant loader above have made it possible for the American miner to reach a daily output that's 4 to 24 times that of any miner in Europe or Asia. Today, the American miner is actually a skilled machine operator. Fully 98% of all American coal is mechanically cut —about 75% mechanically loaded.

In their constant search for a better and more economical coal product the managers of this country's 8,000 mines have invested hundreds of millions of dollars in research—in modern machinery—in finding and developing new mine properties. As a result, today's output per man in America's coal mines is more than 32% greater than in 1939—one of the greatest efficiency gains in American industry. *This nation can count on her privately managed coal companies for all the coal it needs to stay strong—to become stronger!*

BITUMINOUS COAL INSTITUTE
A DEPARTMENT OF NATIONAL COAL ASSOCIATION
WASHINGTON, D. C.

FOR NATIONAL DEFENSE
FOR PEACETIME PROGRESS ***YOU CAN COUNT ON COAL!***

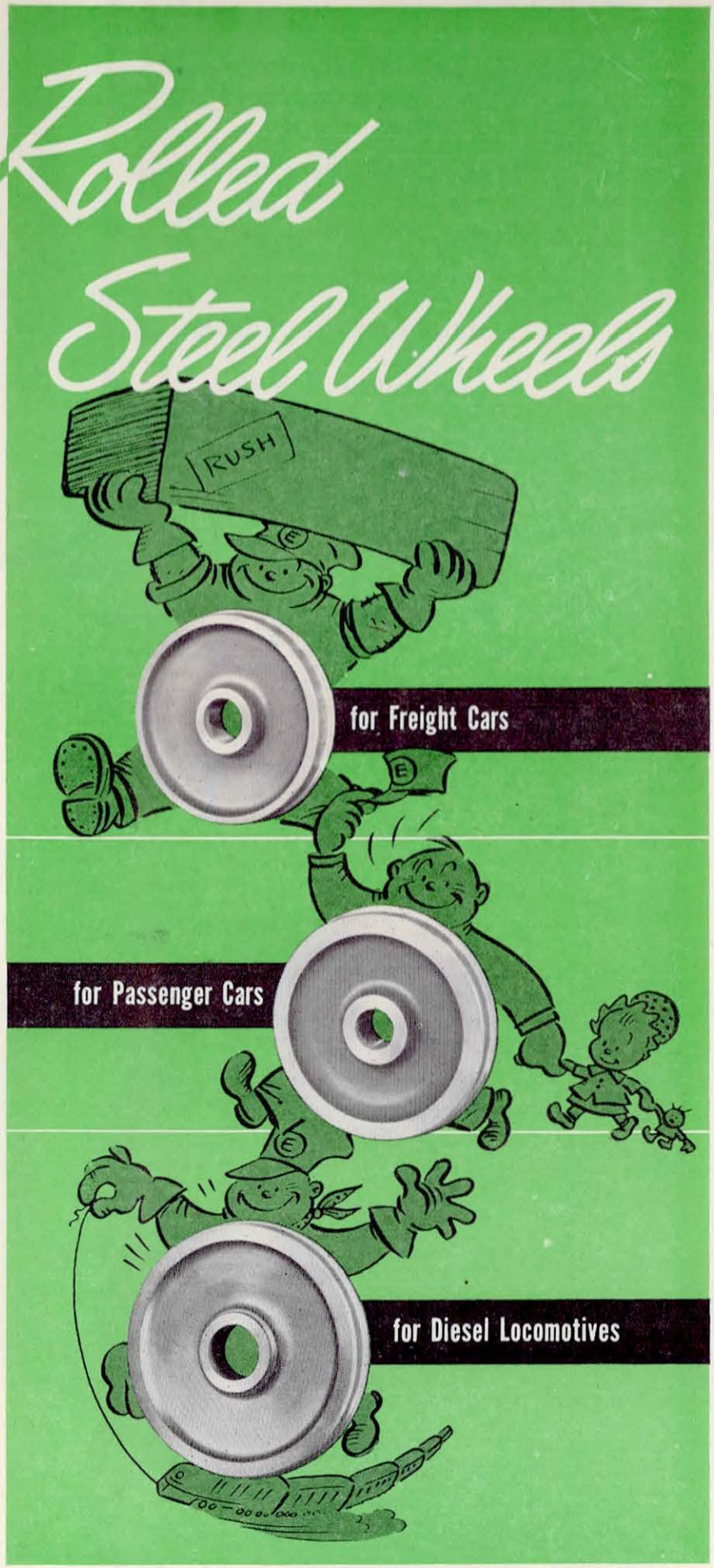
Naturally—General American-Evans uses the Standard *Diagonal Panel Roof, Improved Dreadnaught Ends and Release Rigging on the new Damage Free Cars.*

Standard RAILWAY EQUIPMENT MANUFACTURING COMPANY

310 SOUTH MICHIGAN AVENUE CHICAGO 4 • 247 PARK AVENUE NEW YORK 17

Edgewater

Rolled Steel Wheels



Made under exacting control, from steel produced in our own plant—Heat-treated or untreated—Single wear and multiple wear . . . Made to AAR or ASTM specifications.

E

Edgewater Steel Company

PITTSBURGH, PA.

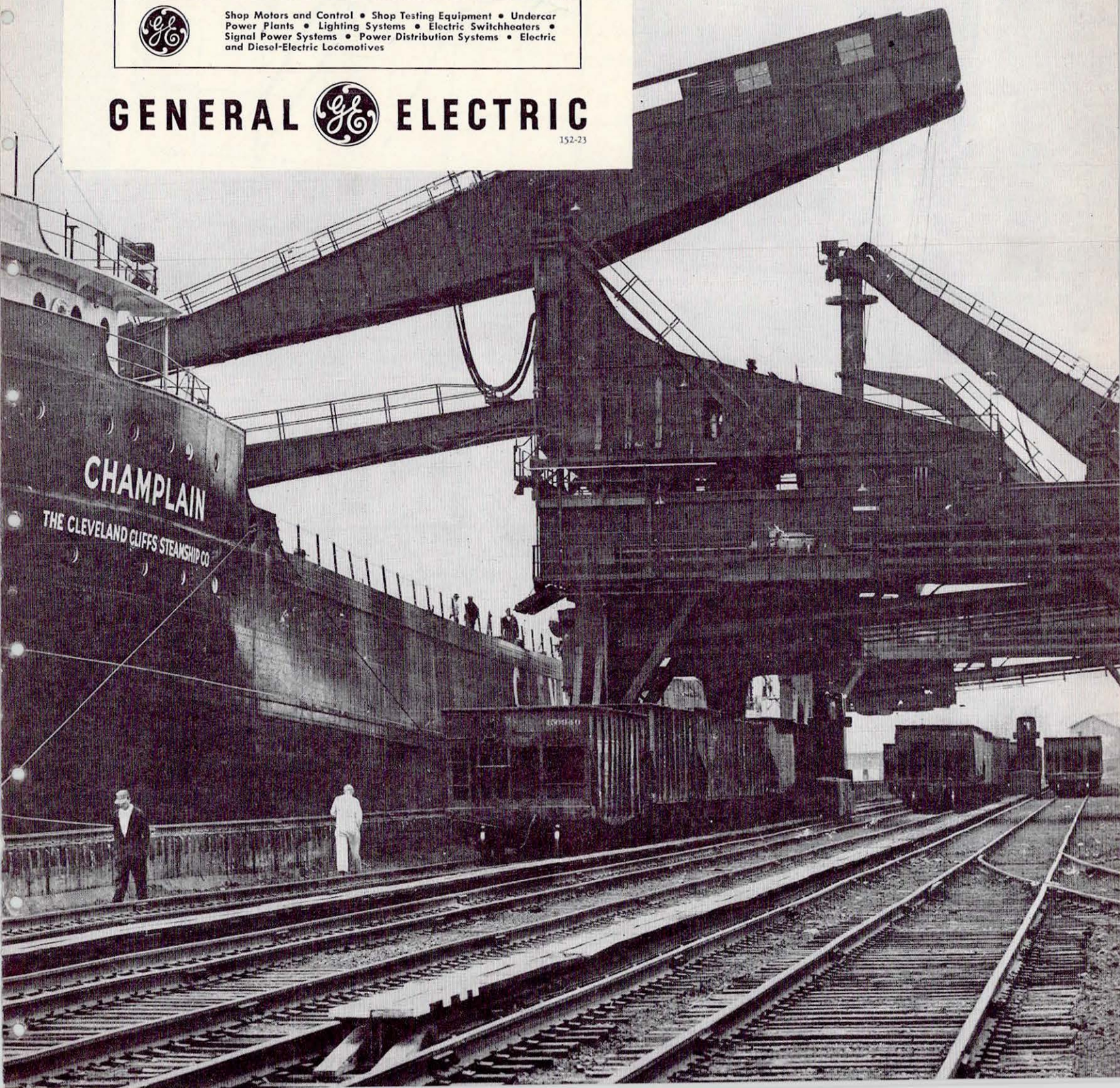
EXPEDITE THE BIG JOBS WITH G-E PROJECT CO-ORDINATION

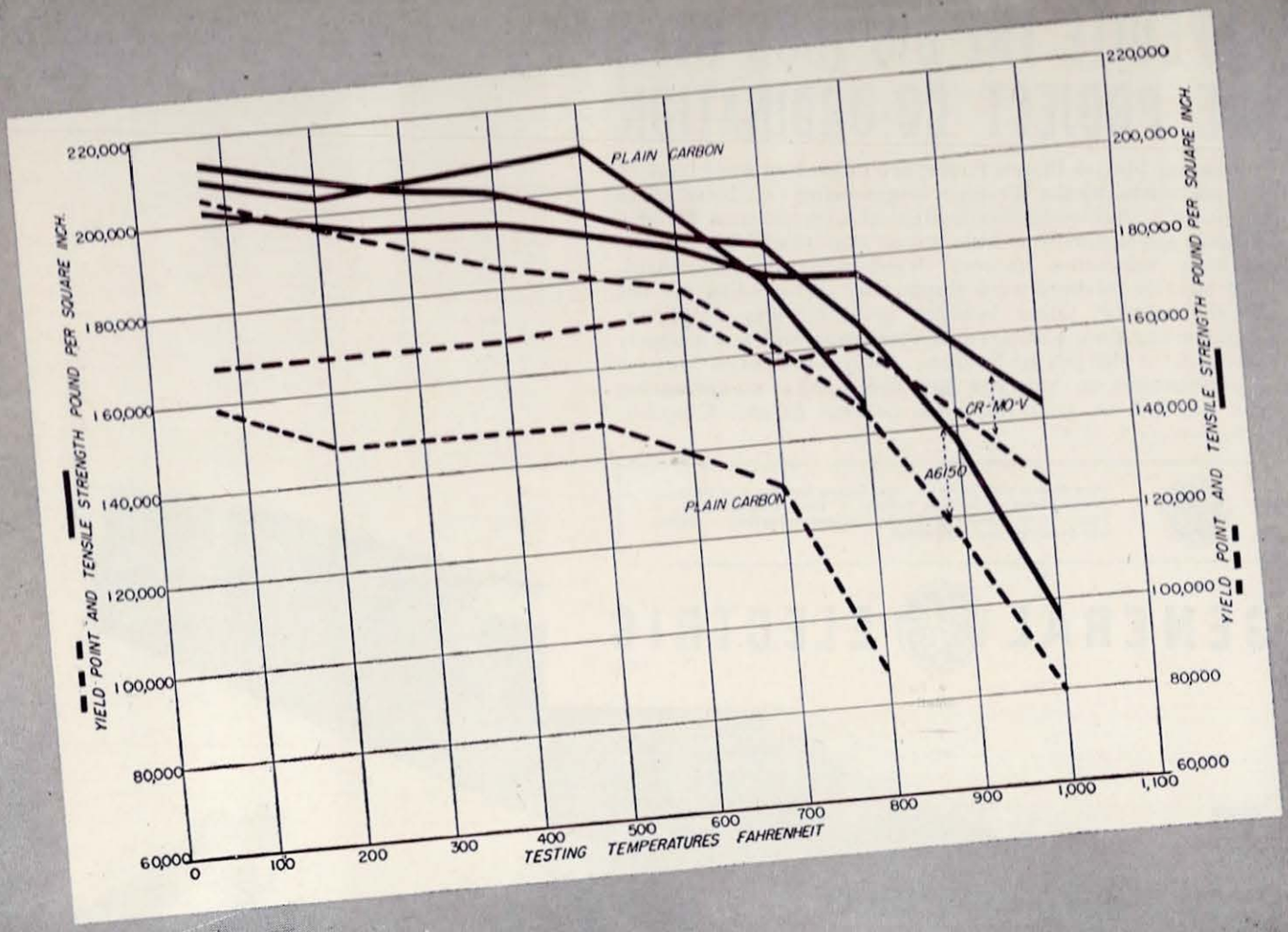
When the Nickel Plate's Hulett ore unloaders were built at Huron, Ohio, by the Wellman Engineering Co., installation of electric equipment was facilitated with General Electric Project Co-ordination. This meant that the G-E 2000-kw package substation, motors, Ward-Leonard type control, and electric pushers were shipped to arrive when needed by the erector. Other benefits: ordering was simplified, engineering time was saved, electric apparatus was properly selected for the job to be done. Ask your General Electric representative to show you how G-E project co-ordination can pay off on your big jobs. *General Electric Company, Schenectady 5, N. Y.*

Shop Motors and Control • Shop Testing Equipment • Undercar Power Plants • Lighting Systems • Electric Switchheaters • Signal Power Systems • Power Distribution Systems • Electric and Diesel-Electric Locomotives

GENERAL ELECTRIC

152-23





HIGH TEMPERATURE PROPERTIES

of Cr-V and Cr-Mo-V Spring Steels

SPRINGS FOR SERVICE at elevated temperatures require steels which resist softening and lowering of the yield point. Unless hardness and yield strength are stabilized by correct alloy additions to the steel, these properties deteriorate rapidly as the temperature is raised.

The chart above shows the yield point and tensile strength of three types of spring steel at elevated temperatures determined by standard short-time tension tests.

Springs of plain carbon steel are sometimes used at moderately elevated temperatures, although their lower yield values prevent them from giving service as satisfactory as that of the alloy spring steels.

Chromium-vanadium steel springs, such as AISI 6150, give better service at ordinary temperatures because of the higher yield point. In addition, they may be used at operating temperatures up to about 700° or 750° F because they retain high yield point values as the temperature is increased.

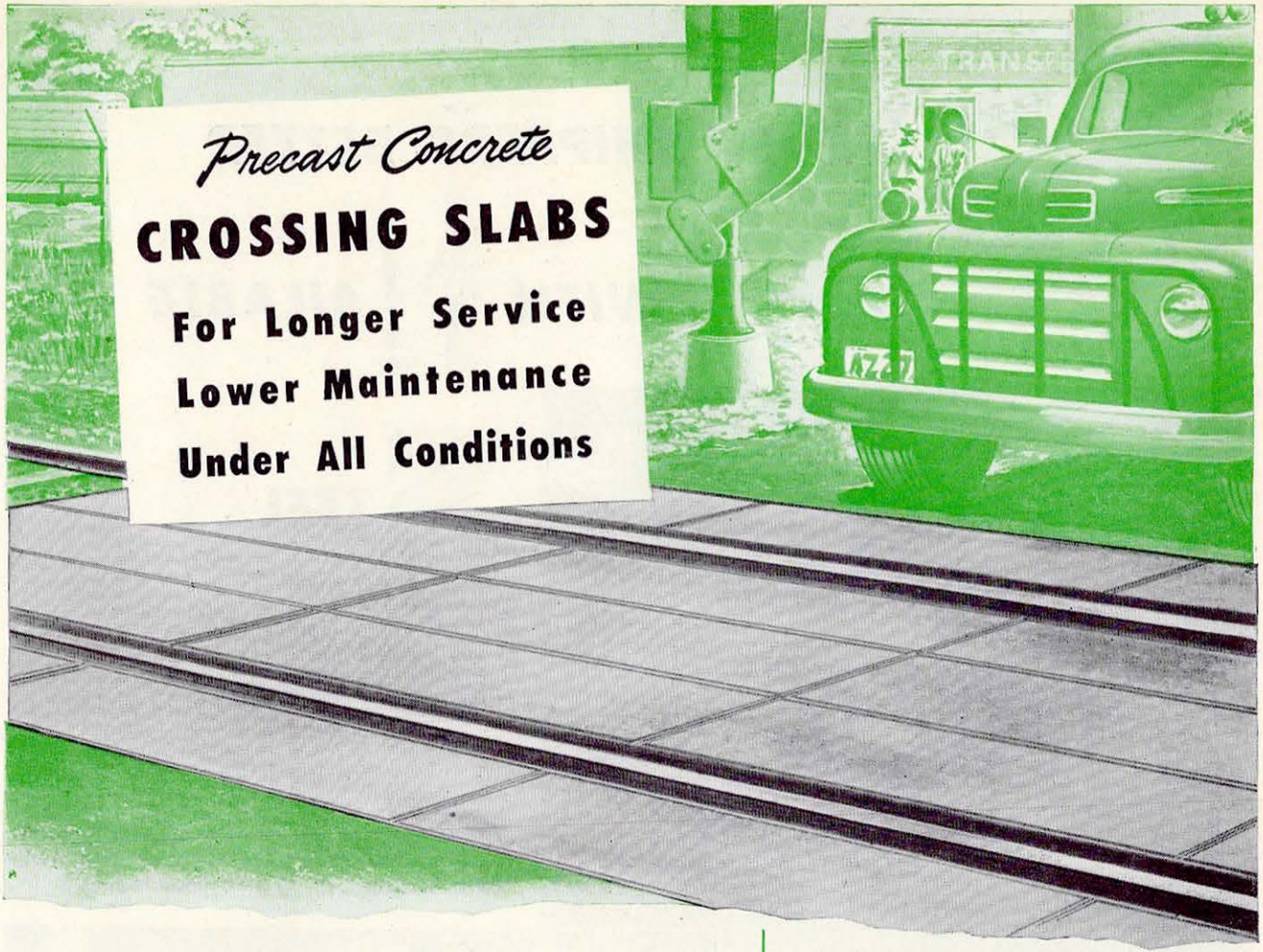
Chromium-molybdenum-vanadium steel was especially designed for springs operating at temperatures in excess of 750° F. It can be used for springs operating at temperatures as high as 850° F or even higher under some conditions. At 800° F, the yield point of this steel is still greater than that of plain carbon steel at room temperature.

If you have a problem in spring applications at elevated temperatures, our metallurgical engineers will be glad to help you solve it.

MAKERS OF ALLOYS — VANCORAM BRAND — CHEMICALS AND METALS

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND •



Precast Concrete

CROSSING SLABS

For Longer Service
Lower Maintenance
Under All Conditions

Under the constant pounding of heavy truck traffic and the most damaging weather conditions, Permacrete Crossing Slabs have established outstanding records of service and safety. Today, on many important roads, they're the accepted standard of low cost, permanent type crossings requiring a minimum of maintenance.

These steel reinforced, precast concrete slabs are made under strict quality-control methods. The convenient 6' length permits easy installation and removal for roadbed maintenance, with "off track" equipment. Permacrete Crossings can be lengthened without disrupting traffic and the slabs salvaged if the crossing is eliminated. Intermediate and end slabs with properly shaped filler and flangeway pieces provide a complete, easy-to-install package unit.

If you want proof of the rugged, dependable service of Permacrete Crossings, we'll be glad to work with you in making a test installation. Write today for further information.

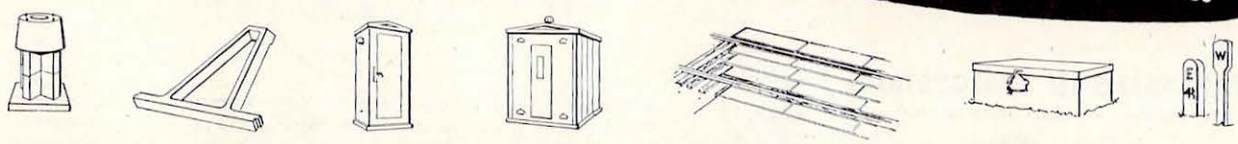
CROSSING SLAB DETAILS

FILLER and FLANGEWAY
Creosoted oak fillers and flangeways shaped to fit various rail sections assure thoroughly tight and firm crossing installations.

HOLD DOWN DEVICE
Where crossings are subjected to extremely heavy, high-speed traffic, Permacrete Crossing Slabs can be supplied with 2 or 4 hold down devices.

SIZES
6' long, 16¾" wide and from 5" to 8" thick. 2" steel channel armor cast in top edges.

PERMACRETE
PRODUCTS CORPORATION
COLUMBUS 7, OHIO
Plants and offices in principal cities



FOUNDATIONS **CRIBBING** **BOOTHS** **HOUSES** **CROSSING SLABS** **BATTERY BOXES** **POSTS**

THE MOST COMPLETE LINE OF SECTIONAL *Precast Concrete* RAILROAD PRODUCTS

SOO LINE

SERVES SHIPPERS BETTER WITH NAILABLE STEEL FLOORING

Fast, safe lift-truck handling saves time and trouble for shippers using SOO LINE cars equipped with NAILABLE STEEL FLOORING.

This lift-truck and load weighs over five tons. SOO LINE chose N-S-F to meet the severe requirements of modern handling methods.

Quickly recognizing the many advantages NAILABLE STEEL FLOORING offers to shippers, as well as to the railroad itself, the progressive SOO LINE management is fast providing more N-S-F equipped cars.

By actual test the SOO LINE convinced itself that N-S-F means better service for shippers, and longer lasting, money-saving service to the railroads.

PATENTS PENDING

N-S-F HOLDS BLOCKING BETTER — A GREAT LAKES STEEL PRODUCT

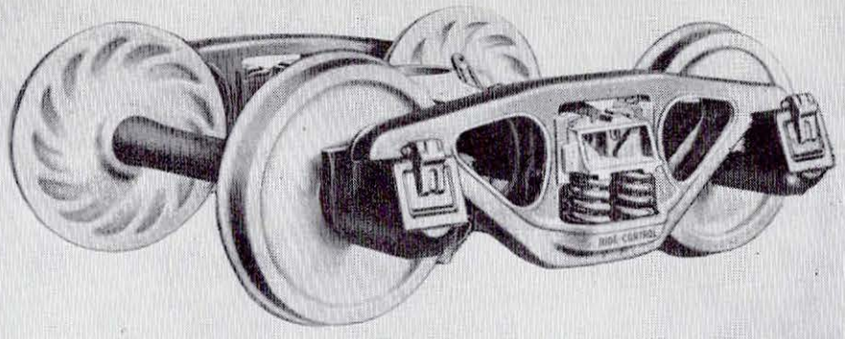
51-SF-9

GREAT LAKES STEEL CORPORATION
Steel Floor Division • Ecorse, Detroit 29, Michigan

PRODUCER OF N-A-X HIGH-TENSILE STEEL

NATIONAL STEEL CORPORATION

NAILABLE STEEL FLOORS *are formed of rigid* N-A-X HIGH-TENSILE *steel channels, welded in place and separated by spacers to form nailing grooves. Stiff plastic composition in the grooves forms a tight seal. Similar composition on the surface provides anti-skid properties.*



THE A·S·F RIDE-CONTROL TRUCK
. . . first—by far—with Users!

More Users buy more A-S-F Ride-Control Trucks than all other trucks combined...because Ride-Control® is smooth-riding, long-lasting--cuts operating costs!

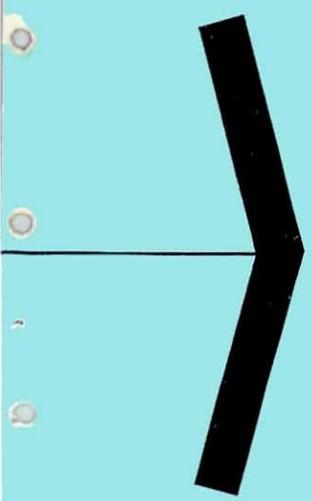
American Steel Foundries
MINT MARK OF ⬡ FINE PRODUCTS

high-pressure where it counts

—IN GENERAL MOTORS DIESEL LOCOMOTIVE ENGINES

High-pressure is built up only at the tip of GM unit injectors which measure, pump and atomize the fuel. There is no central measuring or pressurizing pump and hence no need for high-pressure fuel lines which rupture and break.

And here's the pay-off: GM's unique fuel injection system is so simple that fuel pumps and unit injectors can be replaced or rebuilt at but a fraction of the cost of replacing or rebuilding other types of Diesel fuel systems.



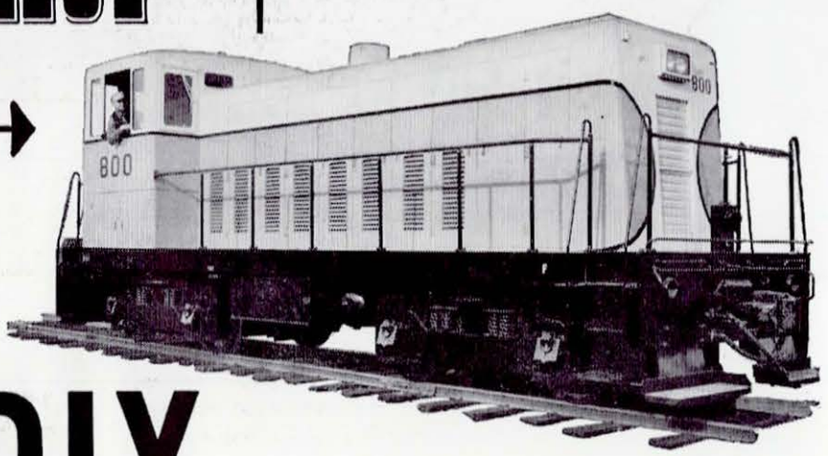
ELECTRO-MOTIVE DIVISION

GENERAL MOTORS GENERAL MOTORS LOCOMOTIVES LA GRANGE, ILL.

Home of the Diesel Locomotive

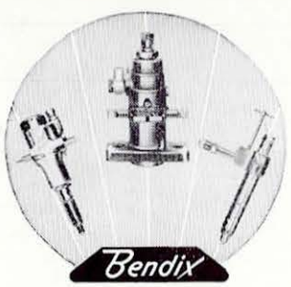
In Canada: GENERAL MOTORS DIESEL, LTD., London, Ont.

A Modern Arkansas Traveller



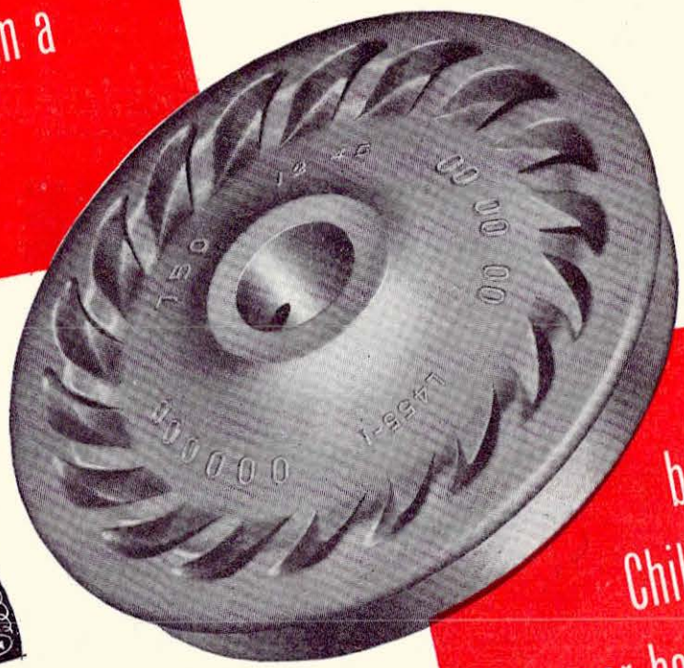
USES BENDIX FUEL INJECTION EQUIPMENT!

THE Arkansas & Ozark Railway, operating with modern and efficient equipment, is recognized as one of the nation's progressive short line railroads. Like many another modern short line the Arkansas & Ozark uses Bendix fuel injection equipment for economical and dependable operation. Many years of diesel engineering experience plus outstanding manufacturing facilities have won for Bendix an ever growing acceptance in the field of fuel injection equipment. It will pay to investigate Bendix before specifying fuel injection equipment on your new motive power.

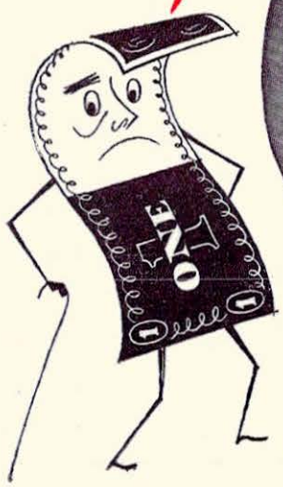


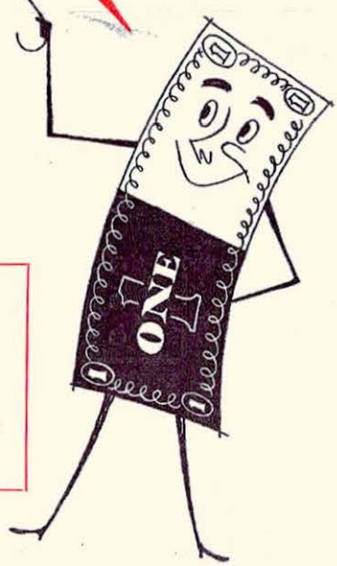
SCINTILLA MAGNETO DIVISION of Bendix AVIATION CORPORATION
SIDNEY, N. Y.
Western Office: 582 Market Street, San Francisco 4, California
Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York

OK... so I'm a 50-cent dollar



but I can buy more in a Chilled Car Wheel than ever before in history





I'm a 50-cent dollar but, when I'm used right, I can give you a 150-cent value.

Take AMCCW chilled car wheels. My predecessor, the 100-cent dollar, used to make out pretty well with these wheels. In 1929, for instance, the AMCCW wheel averaged about 40-million car miles without failure.

But the AMCCW wheels in service during the last five years of the 1940's, after I'd been devalued, gave you 111-million car miles average per wheel failure, according to ICC reports. The figure for 1950 was close to 120-million. See what I mean about that 150-cent value?

The 50-cent dollar has a point there, thanks to the continuous improvement of the AMCCW wheel. Better foundry methods, stricter inspection, association research—all have helped to step up chilled wheel safety and performance, while loads and speeds were being increased.

Increase in Safety Performance for AMCCW wheels
(car miles without failure)

1950	120,000,000
1929	40,000,000
	80,000,000

or 200% increase

Now the heavier rim of the redesigned AMCCW wheel doubles rim strength, further increases flange strength. Thicker, heavier brackets (and more of them) give added flange support. (The new wheel is illustrated above.)

So here's the story in a nut-shell:

Although the dollar has been devalued more than 50 per cent, the safety performance of the AMCCW *wheel has increased 200 per cent!*

For more complete information about the advantages of AMCCW chilled car wheels, send for the booklet, "GENTLEMEN OF THE JURY."

Low first cost
Low exchange rates
Reduced inventory
Short haul delivery
Increased ton mileage
High safety standards
Complete AMCCW inspection
Easier shop handling

AMCCW

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

445 North Sacramento Boulevard, Chicago 12, Ill.

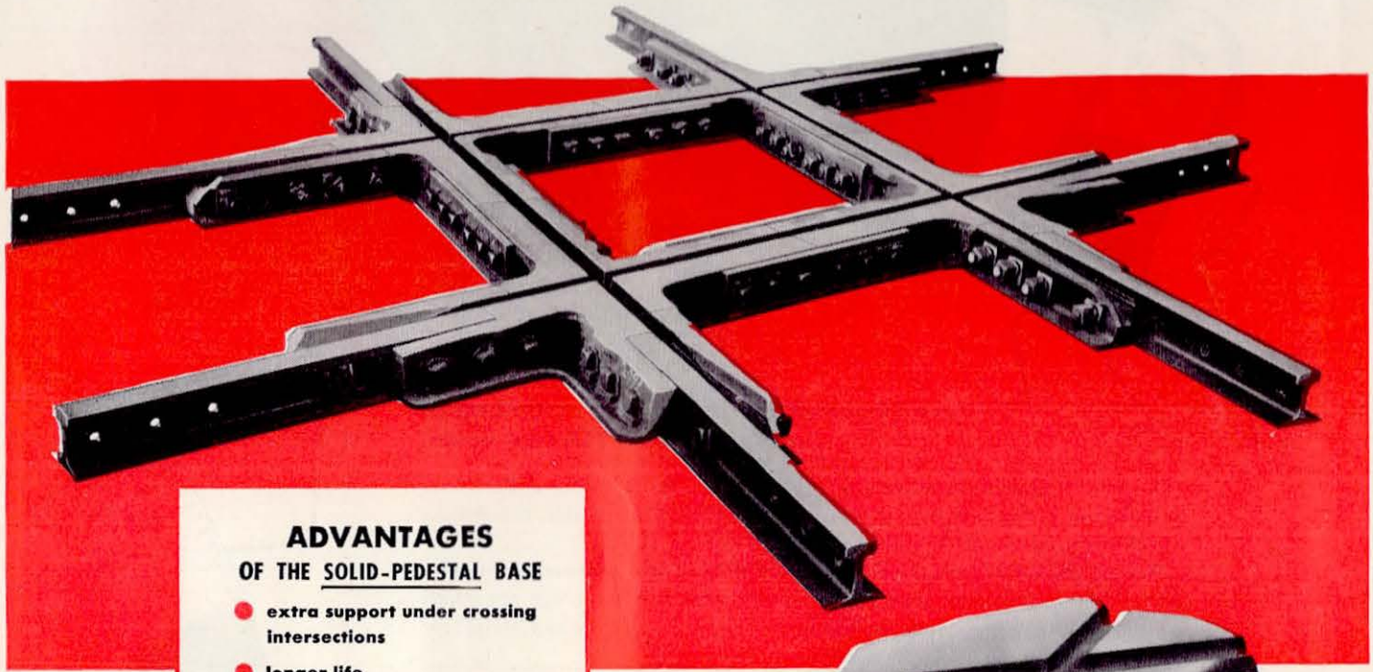
American Car & Foundry Co. • Southern Wheel (American Brake Shoe Co.)
Griffin Wheel Co. • Marshall Car Wheel & Foundry Co. • New York Car Wheel Co.
Pullman-Standard Car Mfg. Co.

The most important crossing improvement in recent years...

Solid-pedestal base plus

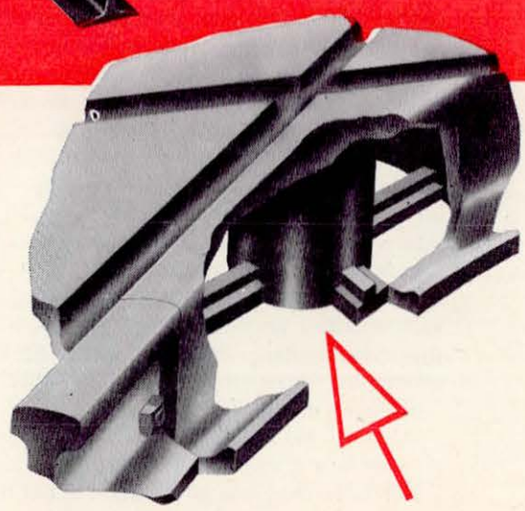
U·S·S MANGANESE STEEL

more durable, lower in



ADVANTAGES
OF THE SOLID-PEDESTAL BASE

- extra support under crossing intersections
- longer life
- improved physical properties
- sounder metal

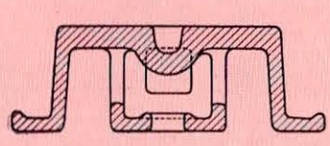


Compare these diagrams

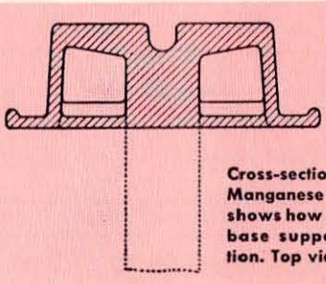
They show clearly why the U·S·S Manganese Steel Railroad Crossing is stronger and more durable.

Below the track intersection, where wheel impact is most severe, the ordinary crossing is hollow (below, left). In the U·S·S Crossing this part is of solid metal giving firm and additional support where it is needed most (center and right, below). It's easy to see why this construction lasts longer.

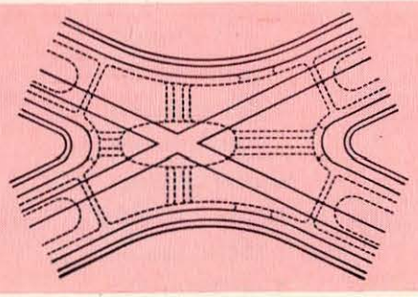
The dotted line in the center diagram indicates the approximate size of the reservoir necessary to handle the extra feed-metal used in casting a new U·S·S Manganese Steel Railroad Crossing. This reservoir (or riser), weighing from 200 to 350 lbs. is cut off and scrapped after the casting has solidified.



Cross-section of old-style manganese steel crossing. Note numerous ribs required to brace the intersection.



Cross-section of new U·S·S Manganese Steel Crossing shows how solid-pedestal base supports intersection. Top view at right.



depth-hardened corners make

RAILROAD CROSSINGS

maintenance, smoother riding

A solid pillar of tough manganese steel directly under all crossing intersections is the exclusive feature that distinguishes this newly developed crossing. Here, where maximum strength is required to resist the destructive pounding of today's faster, heavier trains, the U·S·S Manganese Steel Railroad Crossing is extra strong.

The solid-pedestal base, an integral part of the casting, substantially reduces deflections resulting from wheel batter, a major cause of internal cracks that ultimately lead to complete deterioration of crossings. This vertical pillar of solid metal, rigidly reinforced, is far stronger than any other type of intersection support used today.

Metallurgical advances have improved new U·S·S Manganese Steel Railroad Crossings in still another way. By using more feed-metal (5 to 10 times more than is used in ordinary crossings) and exercising closer control over feeding, liquid metal under greater pressure flows unrestricted at the proper time to the solidifying area, preventing the formation of many of the pores and cavities characteristic of manganese castings.

Thus, in addition to the extra vertical support provided by the solid-pedestal base, the entire casting is sounder, freer of internal flaws, and less susceptible to spalling, chipping or cracking.

Depth-hardened corners reduce maintenance costs, assure smooth riding right from the start

Depth-hardening is another valuable, money-saving feature of the U·S·S Manganese Steel Railroad Crossing.

The ordinary manganese steel crossing is produced to a surface hardness of approximately 200 Brinell. The wheel batter of the first long train is depended on to work-harden the surface to approximately 400 Brinell—the hardness required to stand up under modern rail traffic. Though crudely effective, this wheel pounding also batters down the intersection corners—makes it necessary to build them back to normal track level repeatedly by welding and grinding. This costs money.

In contrast, the improved U·S·S Railroad Crossing has raised pads cast integrally on the three critical crossing corners of each intersection. These are shop-hammered to develop the desired hardness, and then ground down to track level to assure smooth riding. This controlled pre-hammering insures the proper depth hardness *before* installation, eliminates almost entirely the damaging effect of subsequent wheel batter, and virtually eliminates maintenance costs.

Here's why pre-hammered, depth-hardening reduces crossing maintenance

Wheel pounding is the only way the ordinary manganese steel crossing gets sufficient hardness. (Fig. 1) The first long train that batters across the intersection crudely work-hardens the steel to approximately 400 Brinell. But it also batters down the corners about ¼". It takes expensive welding and grinding to rebuild the corners back up to track level.

We avoid this trouble by casting the U·S·S Manganese Steel Crossing with 3/16"-high pads on the three critical corners (see Figs. 2 and 3). These pads are carefully shop-hammered close to track level to develop approximately 400 Brinell hardness, and are then ground to true level *prior* to installation. It saves time and money, gives you a smooth-riding crossing without rebuilding.

ADVANTAGES OF THE DEPTH-HARDENED CORNERS

- **pounding-down of corners virtually eliminated**
- **maintenance costs greatly reduced**
- **much longer life due to higher impact resistance**
- **smooth riding without rebuilding**

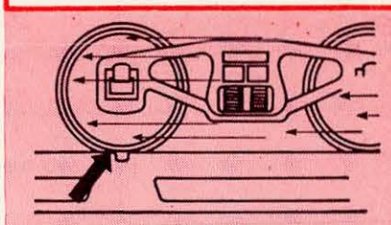


FIG. 1

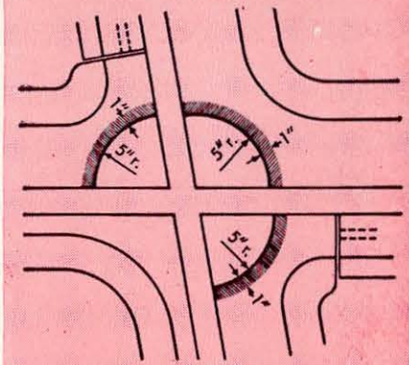


FIG. 2

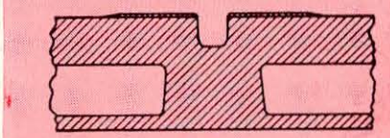


FIG. 3

For the complete story on this crossing, send for descriptive literature. Coupon is attached for your convenience.

United States Steel Company
Room 4273, 525 William Penn Place
Pittsburgh 30, Pa.

Please send me a copy of bulletin "Improved U·S·S Manganese Steel Railroad Crossings."

Name.....

Company.....

Address.....

City.....Zone.....State.....

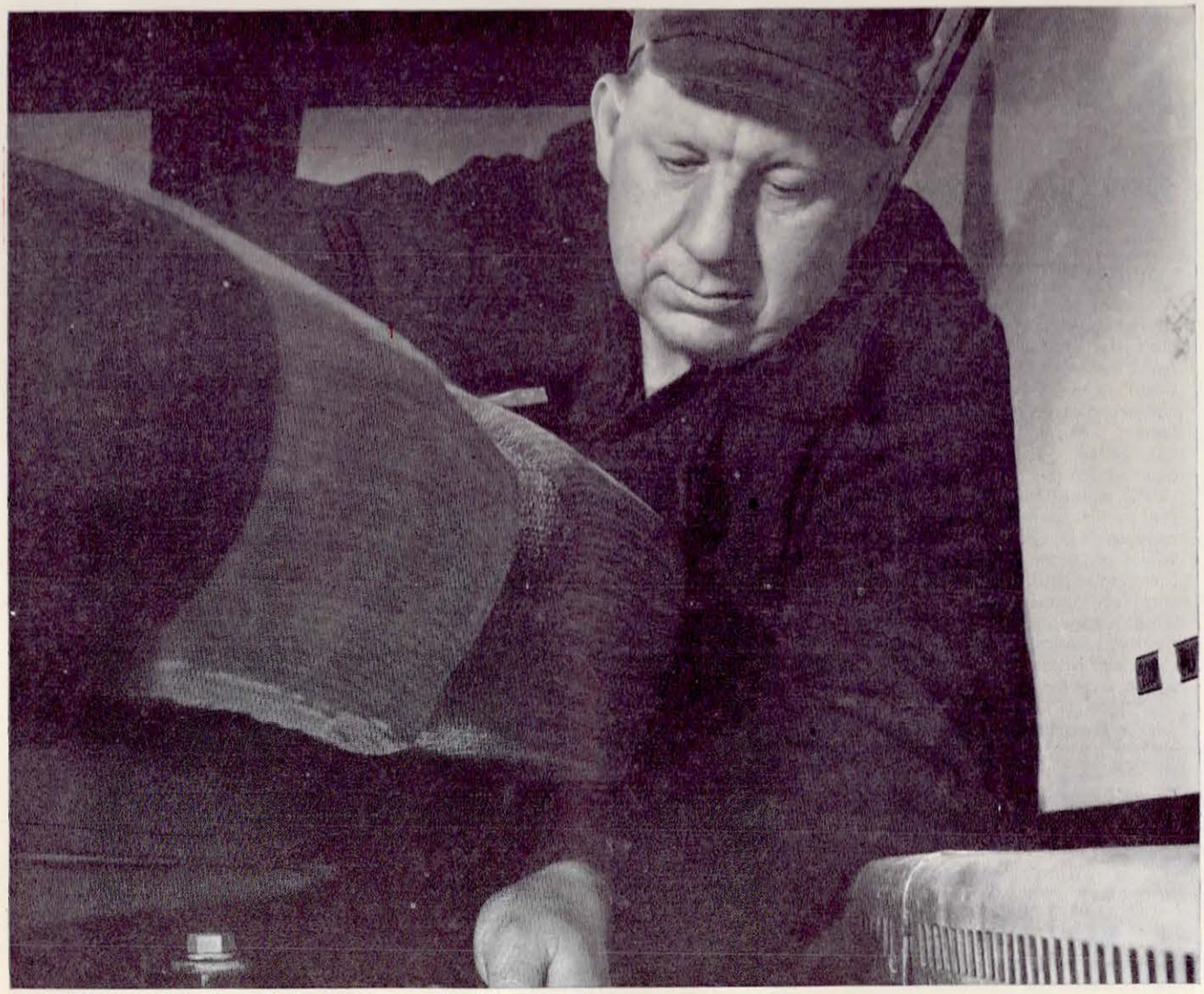
1-912

UNITED STATES STEEL COMPANY, PITTSBURGH • COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TRADE MARK

UNITED STATES STEEL

How much more money will you lose here?



YOUR ANSWER to that question depends on how much longer you're willing to put up with complicated heating systems in your passenger cars. Such equipment requires many costly man-hours for inspection, maintenance and adjustment—and, as you know all too well, cars idled by these demands rob you of important revenue when they are shopped.

Yet, much of this loss is completely unnecessary! Your excess service problem can be solved before next winter comes if you will start *now* to install Honeywell Car-Heating Systems in your passenger cars.

You see, this remarkable system is a much *simpler* system—has less equipment that requires inspection, maintenance and adjustment. This means your men can now *inspect* cars completely and handle them faster on turn-around than ever before. And another great advantage is that with a bare minimum of undercar piping, steam lines are exposed to cold air so little that you actually can save up to 40% on steam! This means you'll have fewer late trains that cost so dearly in overtime and in loss of passenger good will—and *all* of the cars will be heated.

These are just the beginning of the money-saving benefits you can expect from the Honeywell Car-Heating System. For specific facts on what Honeywell heating can do for *your* railroad, call your local Honeywell office. Or write to Minneapolis-Honeywell, Minneapolis 8, Minnesota.

MINNEAPOLIS **Honeywell**

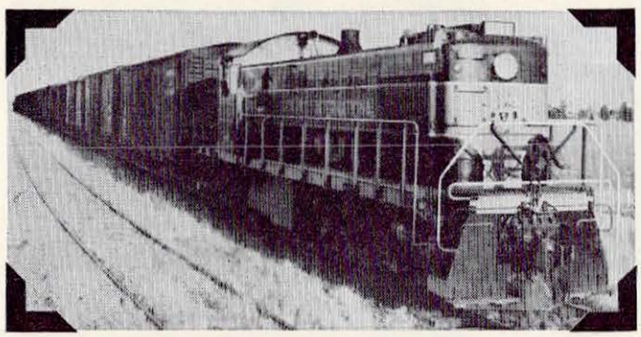
First in Controls

STANDARD ENGINEER'S REPORT

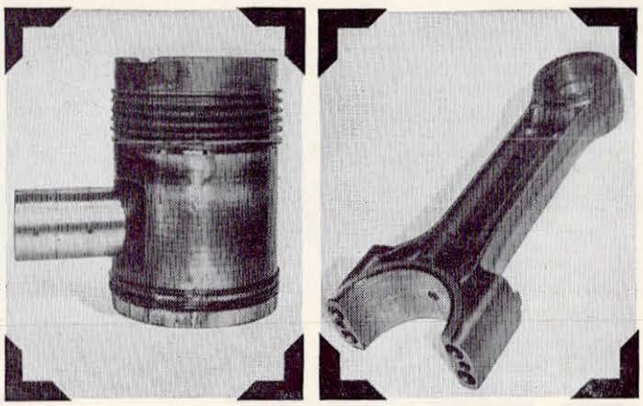
DATA

LUBRICANT	RPM Delo Oil R.R.
UNIT	Alco Diesel – 6 cyl. 12½" × 13" – 1000 H.P.
SERVICE	Mountain haul – Heavy snow, extreme cold
LOCATION	Spokane, Wash.–Yahk, B.C.
FIRM	Spokane International R.R. Co.

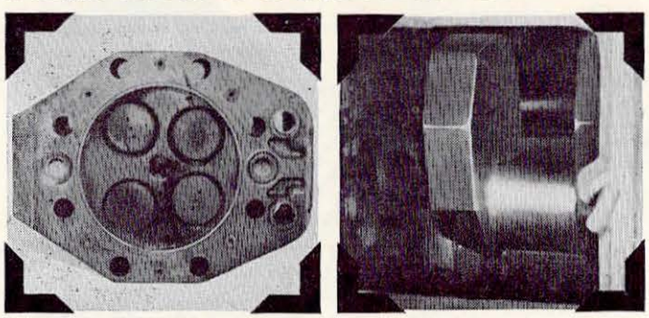
Engines in "perfect condition" after year of toughest service!



LUBRICATED WITH RPM DELO Oil R.R., nine new diesels owned by the Spokane International R.R. Company were kept in regular service for one year. The winter was exceptionally severe and the locomotives bucked heavy snow almost daily. They worked or were idled in temperatures that often for periods of ten days averaged from 20 to 40 degrees below zero.



On inspection at the end of that time there were no accumulations of sludge in oil systems and the engines were in "perfect condition" as pictures of parts from one of them indicate.

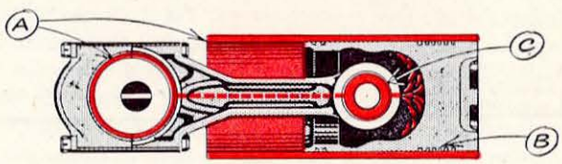


NO CARBON had collected on the cylinder head and all rings were free and functioning properly. Connecting-rod and main bearings and wristpin were within standard tolerance. Measurement of the liner showed less than 0.001 inch wear.

REMARKS: The Spokane International Railroad provides an important connecting service between transcontinental lines through Spokane and the Canadian Pacific to the north. Most of their trackage is in northern Idaho where severe weather and other conditions often make operation difficult. RPM DELO Oil R.R. will meet the toughest weather or operational conditions in all locomotive diesel engines.

RPM DELO LUBRICATING OILS

How RPM DELO Oil R.R. prevents wear, corrosion, oxidation



A. Special additive provides metal-adhesion qualities...keeps oil on parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean... helps prevent scuffing of cylinder walls.

C. Special compounds stop corrosion of bushing or bearing metals and foaming in crankcase.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

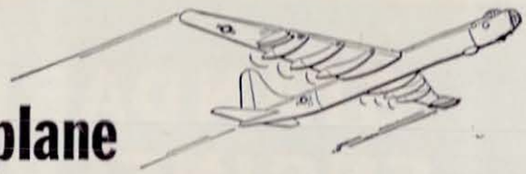
TRADEMARK "RPM DELO" REG. U.S. PAT. OFF

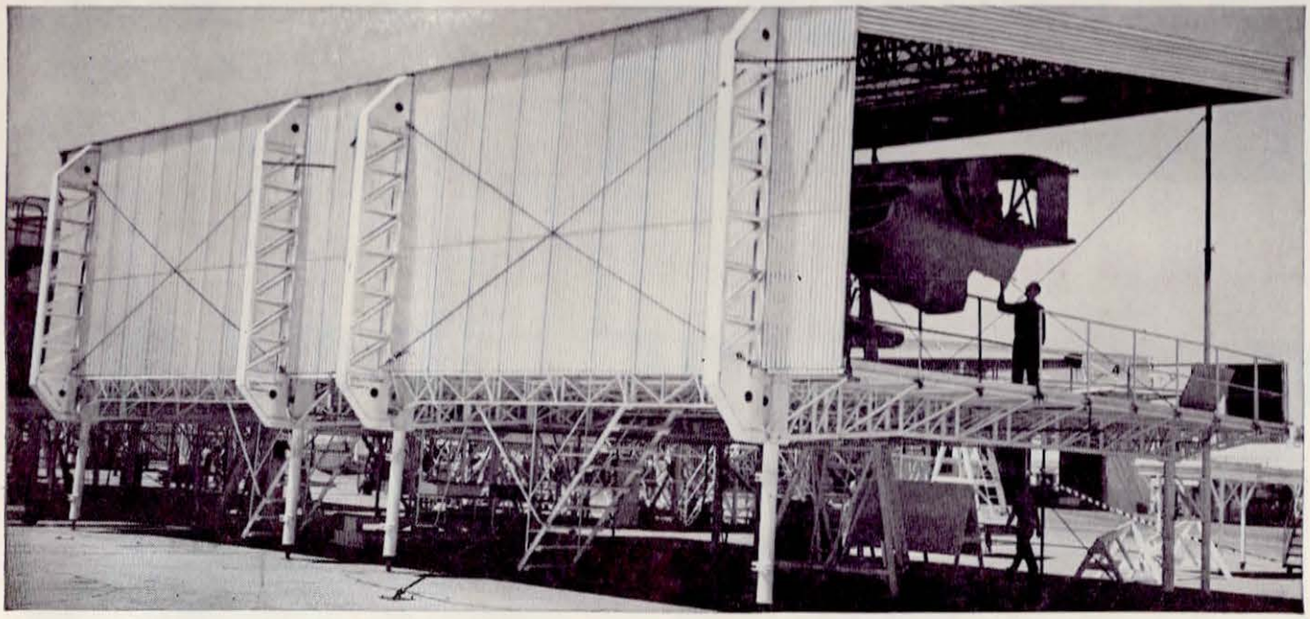
STANDARD OIL COMPANY OF CALIFORNIA
225 Bush Street • San Francisco 20, California

THE CALIFORNIA COMPANY
P. O. Box 780 • Denver 1, Colorado

STANDARD OIL COMPANY OF TEXAS
P.O. Box 862 • El Paso, Texas

Maintenance Dock
for the world's biggest warplane





No Maintenance
for its roofing and siding

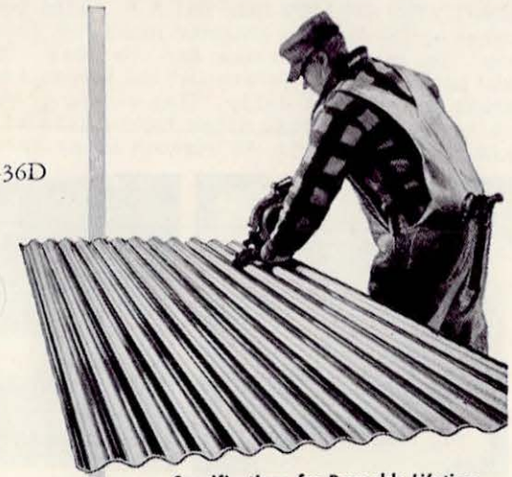
When Consolidated Vultee engineers designed a maintenance dock for the B-36D jet-augmented bomber, they naturally turned to the "aircraft metal" for the closed side and roof—rustproof, corrosion-resistant aluminum.

Reynolds *Lifetime* Aluminum Industrial Corrugated has ample strength for industrial use (see specifications). Yet it weighs only 56 lbs. per square. That's important in this structure that moves up and down on hydraulic jacks; it's important for framing economies in *any* structure. And aluminum's radiant heat reflectivity is another advantage—important under the California sun of this Lindbergh Field, San Diego, installation—important in *any* plant, to keep interiors cooler in summer and warmer in winter.

Call on us for literature, for technical assistance, application details...

• Offices in principal cities. Check your classified phone book for our listing under "Building Products," or write: Reynolds Metals Company, Building Products Division, 2005 South Ninth St., Louisville 1, Ky.

Aluminum is required for planes and other military needs. Reynolds *Lifetime* Aluminum Industrial Corrugated is still produced, but the total supply is necessarily reduced. DO-rated orders receive priority handling.



Specifications for Reynolds *Lifetime* Aluminum Industrial Corrugated:

Thickness .032"
Corrugations 7/8" deep, 2-2/3" crown to crown
Uniform load support (roof) 80 p.s.f. on 4' purlin spacing
Uniform wind load capacity (siding) 20 p.s.f. on girt spacings up to 7'9"
Roofing width 35", coverage 32"
Siding width 33-3/4", coverage 32"
Lengths 5', 6', 7', 8', 9', 10', 11', 12'

REYNOLDS *Lifetime* ALUMINUM INDUSTRIAL CORRUGATED

Rugged! Trouble-Free! Dependable!

Adlake TRADE MARK #31

Electric Lantern

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New features include a bottom guard of rugged one-piece construction for longer life, and a larger reflector of polished stainless steel that insures a more powerful signal.

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HOW CAN SUPPLIERS AID THE RAILROADS POLITICALLY?

The publishers of this paper recently became affiliated with the Transportation Association of America, having reached the conviction that that association is now performing an important and essential service in behalf of the transportation industry and the national welfare, which is not being paralleled by the program of any other organization. This action does not signify by any means that we have relinquished our enthusiasm for championing the railroads' cause as against that of rival transportation agencies. It is not, however, an incongruity but just ordinary common sense, while competing vigorously with a rival, to seek at the same time to reach agreement with him on points of common interest.

Going back several years ago when the Transportation Association had little or no membership among transportation agencies other than the railroads, it was handicapped to our way of thinking, by a "pro-railroad" reputation, while not being able to operate effectively as a partisan spokesman for the railroads because it had foresworn partisanship as among the several rival transportation agencies. We did not then consider T.A.A. to be an especially effective instrument for improving political conditions affecting the transportation industry. But T.A.A.'s status has been completely altered since that time—that is to say, the association has succeeded in enlisting the collaboration of all major forms of transportation in the serious discussion of mutual problems; and substantial progress has been made toward securing a measure of agreement among them on fundamental issues.

Bordering the Miraculous

This endeavor is called by T.A.A. its "national cooperative project." It has involved prolonged discussion over a period of several years by some 300 highly qualified men, divided into "panels," one representing each of the several agencies of transportation, and others representing investors, shippers, lawyers, and other kindred interests—with a coordinating committee for the whole which attempts to bring about as much harmony as possible, when the various panels do not agree.

Considering the degree of acrimony that has developed in the debate of issues between the competing agencies of transportation, the ability the association has shown to bring some measure of mutual understanding among them on their common problems has been an accomplishment bordering on the miraculous. It is an effort which should by all means continue, for the preservation of private ownership of all agencies of transportation—because experience in other countries has shown that the socialization of the railroads, if not immediately followed by the socialization of other agencies, at the very least limits their competition to a comparatively innocuous role.

"Grass Roots" Organization

Besides its effective effort in harmonizing, at least in some degree, the conflicting demands of the embattled rivals in transportation, the T.A.A. is providing another unique service to more intelligent national action affecting transportation through its "sponsorship committees," "enterprise councils," and "regional forums." These groups are "grass roots" organizations of influential citizens who have political power, and who have become sufficiently well posted on transportation questions to be willing to give their political support to positions in which the transportation industry as a whole is in substantial agreement. Thus, to the degree that the various branches of transportation can be brought into agreement regarding national action required to keep the industry in private ownership, there will be political support "back home" in the congressional districts for the program agreed to.

We can perceive no reason why any railroad or railroad manufacturing concern should, in its own interest,

withhold support from the work thus being done uniquely by the T.A.A. in the interest of the nation and a healthy transportation industry in private ownership.

It has always been somewhat of a mystery why companies engaged exclusively or almost so in producing railroad equipment and supplies should have, on the average, been so much less active in political support of the railroads than, for instance, the truck manufacturers have been in the championship of the trucking business. Perhaps the principal deterrent has been the fact that many if not most of the railroads' suppliers also sell products directly or indirectly to rival agencies of transportation. This deficiency of political support has been remedied in large measure—at least on the level of national advertising—by the outspoken campaign in behalf of the railroads on the part of the American Railway Car Institute. But there are other manufacturers just as closely allied to the railroads as the car builders who have not been similarly outspoken—and, anyhow, an all-out program of political and public relations support of the railroads has other effective facets becides advertising, as witness the operations in this sector of the truck manufacturers and suppliers.

Whatever may be the impediments which prevent or discourage railway suppliers from out-and-out partisanship for the railroads by all legitimate and effective means—none of these impediments would operate against the position of the Transportation Association of America, which does not lend its support except to measures regarding which substantial agreement is reached among the interested groups. The T.A.A. reports, however, that, so far, "we have less relative support from the railroad supply industry than any other single group." Possibly the same reasons which delayed the publishers of this paper in affiliating with T.A.A. may explain the reluctance of suppliers to affiliate. We hope so because, as our action in joining the T.A.A. indicates, we believe these deterrent reasons are now no longer operative; and that new reasons have arisen which strongly favor support of T.A.A.'s efforts by all interests in and around every segment of the transportation industry.

"WE HAD A BUILDING"

There once was a boy who had a boomerang which he played with to the exclusion of all his other toys. It became battered and scarred and, when his birthday came around, his parents decided to make him a present of a new one. Then, so the story goes, the boy went nuts trying to throw the old one away.

With the transition from steam to diesel power, the railroads have built many new diesel service shops but, when it comes to heavy repairs, such as traction motor and generator shops, habit or tradition seem to stand in the way.

There are exceptions, to be sure, but over and over again only one answer is given to a variety of questions, as for instance: "Why did you put your motor shop in such an inconvenient spot?" "Well, *we had a building.*" "Why do you try to do the work on two floors?" "*We have a building.*" "Why did you put your motor shop way out on the west end?" "*We had a building.*" "Why do you mix your diesel and steam repairs?" "*We have a building.*" "Why did you make your shop so small?" "*We had a building.*" "Why don't you have more overhead cranes and jibs?" "Well, *we have a building* and it is not strong enough to support them."

This reasoning is not peculiar to the railroads. Just recently the builder of many public utility power stations and substations made a circuit to see what might remain of the work he had done thirty years ago. He found a few holes he had drilled, and an occasional machine foundation. All the power apparatus had been changed, but not a building had been touched.

Buildings get treated as something sacrosanct. No fundamental change can be made in a building costing a few thousand dollars, even though it inconveniences the use of hundreds of thousands of dollars' worth of machinery. It is true that most railroads have not known just what they ought to do about major diesel repairs; and have naturally approached the subject cautiously. But some safe conclusions are now possible. One is that there is need for an acceptable means for determining when and if a motor shop for heavy repairs is required. If that question is decided affirmatively, there remain the questions of what the shop should comprise and where it should be. Certainly, if existing buildings are to be used, the necessary structural changes should become the first thing in the shop design. Economical repairs to motive power and not the preservation of a fictional value in old structures should be the primary goal.

HIGH COST OF IMPACT

One of the subjects planned for discussion at the Association of American Railroads Mechanical Division annual meeting in Chicago during the last week in June, but not included for lack of time, was the high cost of unrestrained impact to lading and equipment in railway freight service. The representative of the Freight Claim Division who was to lead in this discussion says that, although the high cost of inefficient and inadequate damping of longitudinal, lateral and vertical impacts is more or less buried in the claim expense, "even a blind man can see it."

In 1950, for example, the total claims paid for freight loss and damage by United States and Canadian railroads was approximately $89 million, of which $67 million was for damage of undetermined cause. The nature of commodities involved in these damage claims indicates that ineffective or inoperative draft gears and truck springs caused, or contributed to, a large part

of the damage. The claim man says, "Proof of this is lacking, but the claim department by now has enough evidence of the importance of good shock insulation in damage-free transportation to clear its mind of any doubt that rough-riding cars and lifeless draft gears are major factors in damage claims."

By way of example, the rail movement of one fragile commodity is mentioned. The breakage in a test run of 140 cars was 50 per cent less in ordinary cars equipped with various types of snubbers and long-travel springs than in other cars not so equipped. Similar improvement was noted in the transportation of household appliances, plumbing fixtures, glassware, bakery goods, newsprint, eggs and livestock.

Convincing evidence of the damage from rough-riding cars is afforded by experience with dressed beef. The Freight Claim Division reported about 3,000 cases in the last year or so of beef off hooks or torn by hooks pulling through flesh and bone. Showing what can be done to reduce damage claims for this commodity, records indicate that one packer with 3,700 beef cars in service had only one claim amounting to $23 out of a total of $90,000 claims in a certain study. Another packer had greater damage than that in a single shipment. A third large packer, with claims formerly greatly exceeding the other two combined, is reported to have improved truck-spring conditions to such an extent that damage in its cars is no longer a problem.

Largely as a result of freight-truck spring and snubber research conducted by the A.A.R., in conjunction with railway supply companies, interest in this subject has been greatly augumented. It is expected that, roughly, 95 per cent of the freight cars ordered this year will have long-travel friction-snubbed springs. The problem which confronts railroads is to equip the present inventory of older cars still used in high-speed service with modern trucks as rapidly as practicable, not forgetting that many of these cars, up to perhaps 25 per cent, have draft gears which are obsolete or suffer from lack of maintenance, and that snubbers, worn out or broken, are no protection against damaging vertical shocks.

BRAKE SYSTEM LEAKAGE IS CAUSING COSTLY DELAYS

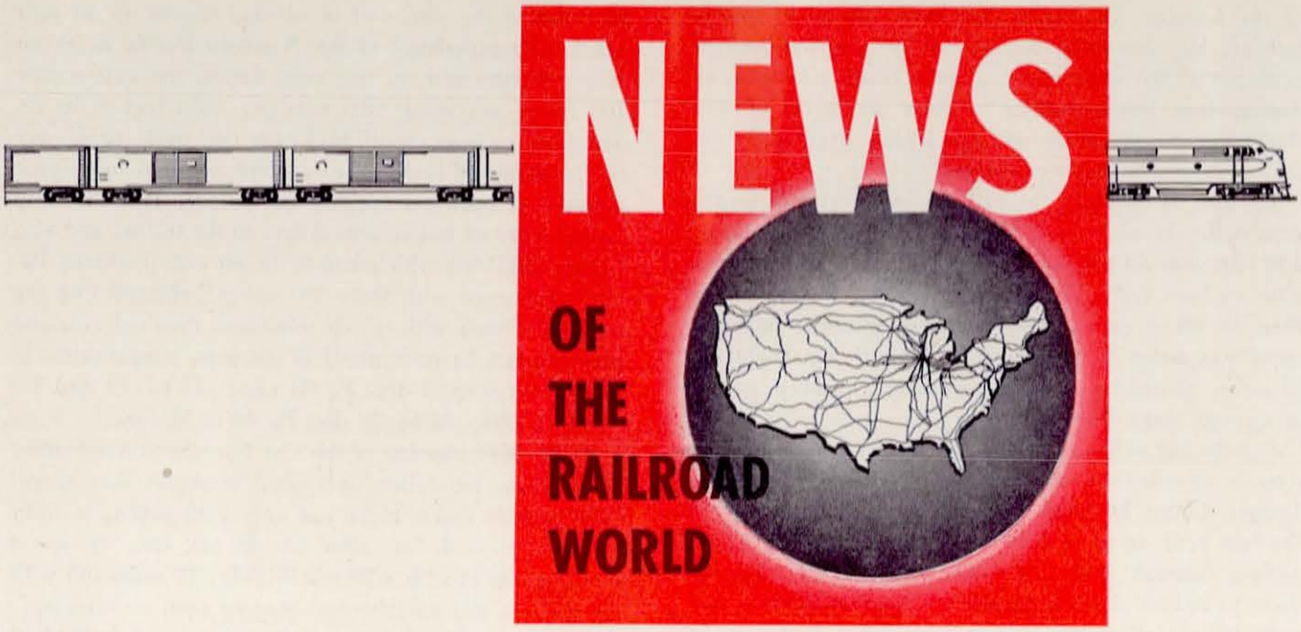
Present conditions and potential difficulties owing to air leakage in the brake systems of interchange freight cars are sufficiently serious to call for attention at the very top of the mechanical and operating departments. For example, at the Mechanical Division, A.A.R., annual meeting in June, the adverse effects of excessive brake-pipe leakage were strongly emphasized. This condition was charged with limiting train lengths, especially during severe winter operation; and was blamed for causing erratic brake action, stuck brakes and train delays, at all times of the year and in varying degree on all railroads. The experience of the Northern Pacific is by no means unique and on this road during the past winter 105 trains averaging 78.5 cars per train had to be reduced on an average of 11.7 cars per train, or 15 per cent, because of inability to get the required brake-pipe pressure at cabooses because of leakage. This difficulty caused more or less serious delays to the trains; and also to the 1,234 cars which had to be set out. Northern Pacific experience with these 105 trains indicated that the number of cars with which minimum required rear-end pressure can be maintained at sub-zero temperatures is as follows: 0 to -5 deg. F., 88 cars; -15 to -19 deg. F., 46 to 74 cars; -31 to -38 deg. F., 44 to 55 cars.

At the May meeting of the Car Foremen's Association of Chicago, the following typical comment was heard, "Our trouble seems to be not only with getting a train out of the yard, but after we do get out, we get a morning report with a 20-minute delay 20 miles out with air sticking and another one later on with air sticking." Of course, such delays are followed up and individual cars are inspected and tested. In most cases, however, nothing wrong can be found. The trouble evidently comes from general brake-pipe and brake-system leakage in other cars of the train—caused by loose pipe connections, defective gaskets, leaky air hose, angle cocks or couplings, and failure to straighten or apply new AB-valve back covers, improved AB-valve ball-check covers and new AB-valve gaskets.

One thing which complicates the problem is that concentrated leakage due to one or more bad pipe connections may not show up when a car is standing, but causes heavy loss of air locally under the shock and stress of train movement; and applies the brakes on several adjoining cars in a long train. This emphasizes the necessity for thorough checking and correction of air leaks, not only when brake equipment is cleaned and tested at 15 or 36-month periods, as specified by I.C.C. and A.A.R. rules, but at all subsequent times when cars are on repair tracks for other work and air leaks can best be stopped. It is this "in date" single-car brake testing between regular cleaning periods, as required by Rule 101(a), which causes so much trouble when neglected.

This matter has been thoroughly covered by three Mechanical Division circular letters since 1948 and one strong appeal by the vice-president of the A.A.R. Operations and Maintenance Department, on August 7, 1950. In spite of this intensive effort to get the condition corrected, responsible car officers say that practically no railroad observes Rule 101(a) one hundred per cent; only a few, mostly in northern territory, make a really serious effort to observe it; and others make "in date" air brake tests if and when they can.

Cutting corners on the repair track doubtless helps the mechanical department with its budget but, when the effects on train operation and car delays are appraised, has there been any real saving to the railroad operation as a whole? That is a question for top management to look into.



R.B.A. Survey Shows "Vigorous Opposition" To Any Nationalization of U.S. Railroads

"Thinking and suggestions" of business groups are assembled for presentation to Congress

Vigorous opposition to any tendency toward nationalization of United States railroads is the dominant theme of replies of business organizations and trade associations to a suggestion by the Railway Business Association that they make recommendations for amending the National Transportation Act.

The R.B.A. suggestion was embodied in letters sent during the past six months to executive heads of business organizations in all parts of the country. Enclosed with each letter was a copy of the statement "The Need Is Now—For Sound Policies in Transportation," which contained recomendations approved by the governing board of the R.B.A. and submitted in 1950 to the transportation subcommittees of both houses of Congress by R.B.A. President P. Harvey Middleton. (*Railway Age*, April 22, 1950, page 65.)

Verbatim excerpts from the replies of many of the canvassed organizations have just been made public for the first time in a 39-page pamphlet called "National Transportation Problems—And What Business Groups Think About Them," which has been sent to railroad executives and to all members of both houses of Congress.

"The association believes," Mr. Middleton, who conducted the survey, said, "that the House and Senate transportation committees, to which the most complete presentation of facts and figures ever assembled on this subject was made at Congressional hearings during the past year, will also welcome the thinking and suggestions of business groups outside the transportation industry. The reactions of business groups generally to the present transportation situation and problems carry weight because the railways provide the essential transportation upon which the continued successful operation of all other industries depends."

Crux of the Problem

The crux of the transportation problem, says the report, "lies in the unsatisfactory financial condition of the railways, the backbone of the nation's transport system. Diversion of traffic, largely due to subsidized competition and inequality in regulation, and major cost increases in wages, materials and taxes, are the reasons why the earnings of the completely self-supporting railway industry are so inadequate." It is evident from letters received by the R.B.A. that boards of directors of business groups are in substantial agreement that all forms of transportation should be permitted to earn a fair return on net invested capital "so as to enable them to attract the necessary new capital for maintaining a quality of service that will most adequately meet the needs of the public," to quote one comment.

There are frequent references in the letters to the danger of nationalization unless the transportation system is permitted to earn a fair return. Harold F. Hammond, manager of the Transportation and Communication Department of the Chamber of Commerce of the United States, said: "The Chamber believes that the existing unfavorale financial position of the transportation system is not in keeping with the national transportation policy which declares that the Interstate Commerce Act shall be so administered as to 'foster sound economic conditions in transportation and among the several carriers.' It recommended that in order to provide a clear and definite mandate to the I.C.C. for a fair return, there should be included in the statement of national transportation policy language similar to that in Section 15a of the Interstate Commerce Act. It is our belief that it is necessary to give more emphasis to the fair return principle, because over the last 25 years the records show that it has not been adequately cared for by the regulatory body."

N.I.T. League "Concerned"

On the question of fair return, E. F. Lacey, executive secretary of the National Industrial Traffic League, said the league was becoming "increasingly concerned about the straitened financial condition of the railroads of the United States. This situation poses a threat of government ownership of the railroads which does not come from a public desire, but from the aforemen-

tioned economy stress in which the railroads presently find themselves."

Mr. Middleton, in the report, cited the following as typical of opinions held by business interests on the highly controversial subject of federal aid: "For any group to insist upon the continuance of special privilege is worse than futile. It is a reckless invitation to more and more government controls, with nationalization as the only final result." Another respondent said "the government's continued practice of granting large subsidies and other privileges to competing forms of transportation, while the rail carriers continue to pay high taxes and maintain their own right-of-way, is an unfair practice which does not permit them to earn a fair return."

While many organizations vigorously opposed subsidies in the field of commercial transportation, some suggested that withdrawal of federal aid should be gradual, to prevent undue disturbance of existing services. The N.I.T.L. is opposed to subsidy payments to carriers. "In promotional periods," its statement pointed out, "the federal government has aided transportation from the very beginning, but there comes a point where aid should be suspended and each particular mode of transportation should be on a self-sustaining basis."

Adequate User Charges Favored

Adequate charges for use of transportation facilities constructed and maintained by the government are favored by many business organizations, Mr. Middleton said. He quoted one organization as follows: "A method of financing under which the user pays for such construction rather than the general taxpayer seems not only desirable and equitable, but necessary to preservation of our private enterprise system. A user charge has the further advantage of providing a broad restraint upon the development of uneconomic projects, a better basis for competitive relationship between the different modes of transportation, while lessening the disadvantages inherent under our present policy, and of developing a national properly coordinated transportation system within which each mode of transportation will perform that service which it can perform most efficiently at the lowest true cost."

There was agreement in the statements of a number of important organizations that commercial carriers should have equal opportunity in the use of transport facilities provided by public funds, subject always to approval of the regulatory authority. In regard to the related question of whether these carriers should be permitted to operate other forms of transport within reasonable territorial limits, feeling was expressed in several replies that while such coordination was desirable, it should not be required by law, but that it should be encouraged by elimination of any provisions of the law, or its interpretations which now restrict voluntary cooperation of this character. The present policy of voluntary, not mandatory, railroad consolidations also was recommended by a concensus of opinion.

Most organizations went on record as favoring a single regulatory agency, although a number raised the question of the advisability of continuing for a further period separate regulation of air transport. The Chamber of Commerce of the United States, which previously had taken the position that for a further limited period air transport should be under separate regulation, adopted a declaration at its annual meeting in Washington last May in favor of "one permanent transportation regulatory agency that shall report directly to Congress." The chamber is on record as favoring discontinuance of the Federal Barge Lines at an early date. The same position was taken by the N.I.T.L., which opposed over-regulation of transportation as impinging upon managerial functions. The N.I.T.L.'s statement said:

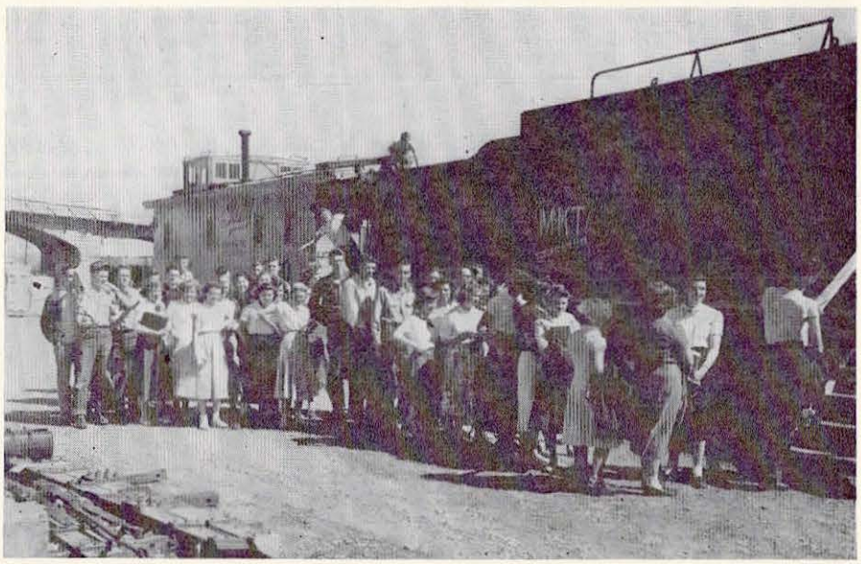
"It is quite obvious that regulation should not 'attempt to run the business' of transportation, as that is a managerial function which should be scrupulously preserved. Although over-regulation may hasten the end of private management, that is not the only government menace. An even greater one is the increasing tendency of the government to promote some forms of transport over others. This situation obviously weakens the whole transport system and eases the way to government operation."

Canada Appoints "Bulk Transport" Controller

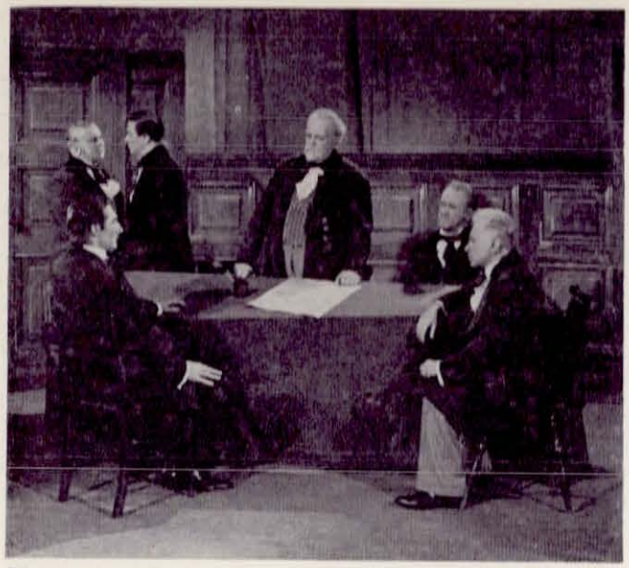
Stating that "demands of the grain trade and of the defense effort are placing an added strain upon certain of the transportation facilities of Canada," Lionel Chevrier, Minister of Transport, announced on August 30 at Ottawa the government's decision, under the Emergency Powers Act, "to provide for a limited control of railway and water transportation."

In making the announcement, the minister named Roy Wilfred Milner, of the Board of Grain Commissioners, Winnipeg, and formerly general manager and director of Alberta Pacific Grain Company, as transport controller; and W. Jackson Fisher, director of the Traffic Services branch of the Canadian Maritime Commission, as deputy transport controller.

Mr. Chevrier said the transport controller and his deputy would have power to determine priority of movement to be given to grain or to any other bulk commodity, and to make orders and issue directions according-



SCHOOL CHILDREN—1,500 STRONG —visited the Missouri-Kansas-Texas' shops at Denison, Tex., during the observance of Texas Industrial Week. The pupils were divided into groups of 25 or less; each day, 10 local Katy employees guided a single group through the wood and steel erecting shops, the wheel shop, the mill and the stores department. As an added attraction, a steam passenger locomotive and a caboose were spotted in the area for the children's (and their teachers') inspection. Because the Katy's shops are the largest single industry in Denison, the students not only learned the importance of the shops to the railroad, but also got an insight into the importance of the company to the community and to their daily lives



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"THE SONG OF MID-AMERICA"

These selected scenes from the new Illinois Central 16-mm. sound film, "The Song of Mid-America," reveal that, as a public relations venture, this 45-min. production differs greatly from any other film that has come from the railroad industry to date.

Not once does the audience see an Illinois Central train, yard, bridge or any other physical facility of the past or present. Instead, producer Helen Ticken Geraghty (who produced the Chicago Railroad Fair pageant) has made effective use of the hitherto unused medium of the musical revue to relate the I.C. story solely in terms of men and events. Based on the somewhat longer pageant which Mrs. Geraghty originally produced for the I.C.'s centennial banquet in Chicago last February, the film has enabled the road to bring that highlight of the banquet to every community along its lines. The film is now available for showing to schools, clubs and similar organizations through any I.C. representative, as announced on page 62 of the July 30 *Railway Age*.

1—1851—The Railroad is Born—"We can't grow if the mud hems us in," says Senator Stephen A. Douglas (seated, right). "It is my considered judgment that the state and the nation need this railroad," agrees Abraham Lincoln (seated, left).

2—Chief engineer, Col. Roswell B. Mason, urges discouraged workers to continue their task of building the first main line. Hardships had seemed overwhelming, but Col. Mason made the men understand the importance of their task and work was resumed.

3—During the Civil War, the I.C. became a vital factor in military operations. Here Marvin Hughitt, then master of transportation at Centralia, holds the fate of Union forces in his hands for 72 sleepless hours.

4—Retiring I.C. Conductor Charlie Taylor (left), central figure in the entire show, lifts a bottle of pop to toast his fellow workers and the organization that has served under the name Illinois Central for 100 years.

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ly. Powers of the controller and his deputy apply to movement of bulk commodities only.

The control over transport facilities includes railways, Canadian registered ships of 1,000 gross registered tons or over, and storage facilities capable of being used in connection with transporting bulk commodities. Bulk commodities coming within transport control regulations include wheat, flour, flax, barley, rye, buckwheat, corn, oats, mill feed and grain screenings; ores and minerals; ferrous metals; iron and steel scrap; sand, stone and gravel; pulpwood, woodpulp, poles and logs; coal and coke; and sulphur and phosphate.

The new transport authority is expected to boost daily grain movement by ship from the head of the lakes from 1,200,000 bushels to 2,000,000 bushels; this can be done, officials say, without any serious disruption of present facilities. It will mean, too, that the minimum wheat movement to seaboard before the close of lake navigation will be 300,000,000 bushels. This will leave, however, a backlog of at least 700,000,000 bushels of all grains to be moved eastward before the end of the present crop year, next July 31.

The basic problem involved is said to be not so much lack of equipment as it is the timing of movements to obviate bottlenecks. Present large stocks of grain at lakehead terminals, and the number of cars tied up en route or awaiting unloading, are the most immediate difficulty. The whole situation has been under review by the Department of Transport, through a committee headed by J-C. Lessard, deputy minister, and consisting of representatives of railways, ship owners and shippers. This committee itself had no authority to expedite heavy grain and ore movements, but it was its reports which led to creation of the office of transport controller.

The new transport controller, Mr. Milner, has had an extended career in the grain trade as well as considerable experience in transportation, beginning in 1909, when he joined the Zenith Grain Company in Winnipeg. On his return to civilian life following overseas service with the Motor Transport Corps during World War I, he joined the Alberta Pacific Grain Company, becoming assistant general manager of that company in 1927 and subsequently general manager and director. He was president of the Winnipeg Grain Exchange in 1936 and in 1950 was appointed to the Board of Grain Commissioners.

Mr. Fisher, the new deputy controller, has also been connected with the grain trade and with transportation. Born in Calgary, Alta., he attended Western Canada College and Queen University. He was on the staff of the Alberta Wheat Pool and later of the Canadian National and the Canadian Pacific. During World War II he was director of movements in the Canadian Army, and after the war joined the Department of Trade and Commerce as traffic officer in the trade

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commissioner service. On formation of the Canadian Maritime Commission in 1948 he was appointed director of its Traffic Services Branch.

Net Income for 1951 Reaches $272 Million

Net railway operating income is $430.4 million

Class I railroads in the first seven months of 1951 had an estimated net income, after interest and rentals, of $272,000,000, compared with $273,000,000 in the corresponding period of 1950, according to the Bureau of Railway Economics of the Association of American Railroads. The seven-months' net railway operating income, before interest and rentals, was $430,439,242, compared with $431,815,948.

Estimated results for July showed an estimated net income of $17,000,000, compared with $59,000,000 in the same month last year. Net railway operating income for the 1951 month was $41,934,985, while in July 1950, it was $84,157,336.

In the 12 months ended with July, the rate of return averaged 4.21 per cent, compared with 3.13 per cent for the 12 months ended with July 1950.

Gross in the first seven months of 1951 amounted to $5,852,688,158, compared with $4,995,868,031 in the same period of 1950, an increase of 17.2 per cent. Operating expenses amounted to $4,659,130,003, compared with $3,933,258,106, an increase of 18.5 per cent.

Twenty-two Class I roads failed to earn interest and rentals in the seven months, of which 12 were in the Eastern District, two in the Southern region, and eight in the Western district.

CLASS I RAILROADS — UNITED STATES

	1951	1950
Month of July		
Total operating revenues	$ 816,811,659	$ 772,160,756
Total operating expenses	683,823,556	579,116,186
Operating ratio — per cent	83.72	75.00
Taxes	73,139,048	93,824,366
Net railway operating income (Earnings before charges)	41,934,985	84,157,336
Net income, after charges (estimated)	17,000,000	59,000,000
Seven Months Ended July 31, 1951		
Total operating revenues	5,852,688,158	4,995,868,031
Total operating expenses	4,659,130,003	3,933,258,106
Operating ratio — per cent	79.61	78.73
Taxes	643,599,245	527,361,340
Net railway operating income (Earnings before charges)	430,439,242	431,815,948
Net income, after charges (estimated)	272,000,000	273,000,000

Class I roads in the Eastern district in July had an estimated net income of $8,000,000, compared with $22,000,000 in July 1950. In the seven months, their estimated net income was $87,000,000, compared with $102,000,000 in the same period of 1950.

Their net railway operating income in July amounted to $22,095,057, compared with $34,792,184 in July 1950. Those same roads in the seven months had a net railway operating income of $180,068,617, compared with $187,736,149 in the same period of 1950.

Gross in the Eastern district in the first seven months of 1951 totaled $2,615,914,451, an increase of 16.4 per cent compared with the same period of 1950. Operating expenses totaled $2,129,645,900, an increase of 18.3 per cent.

Class I roads in the Southern region in July had an estimated net income of $5,000,000, compared with $7,000,000 in July 1950. In the seven months, their estimated net income was $7,000,000 in July 1950. In the seven 000 in the same period of 1950.

Their net railway operating income in July amounted to $8,215,931, compared with $10,271,458 in July 1950. Those same roads in the seven months had a net railway operating income of $79,535,462, compared with $76,408,347 in the same period of 1950.

Gross in the Southern region in the first seven months of 1951 totaled $834,901,680, an increase of 17 per cent compared with the same period of 1950. Operating expenses totaled $646,514,455, an increase of 17.8 per cent.

Class I roads in the Western district in July had an estimated net income of $4,000,000, compared with $30,000,000 in July 1950. Their estimated net income in the seven months was $128,000,000, compared with $116,000,000 in the same period of 1950.

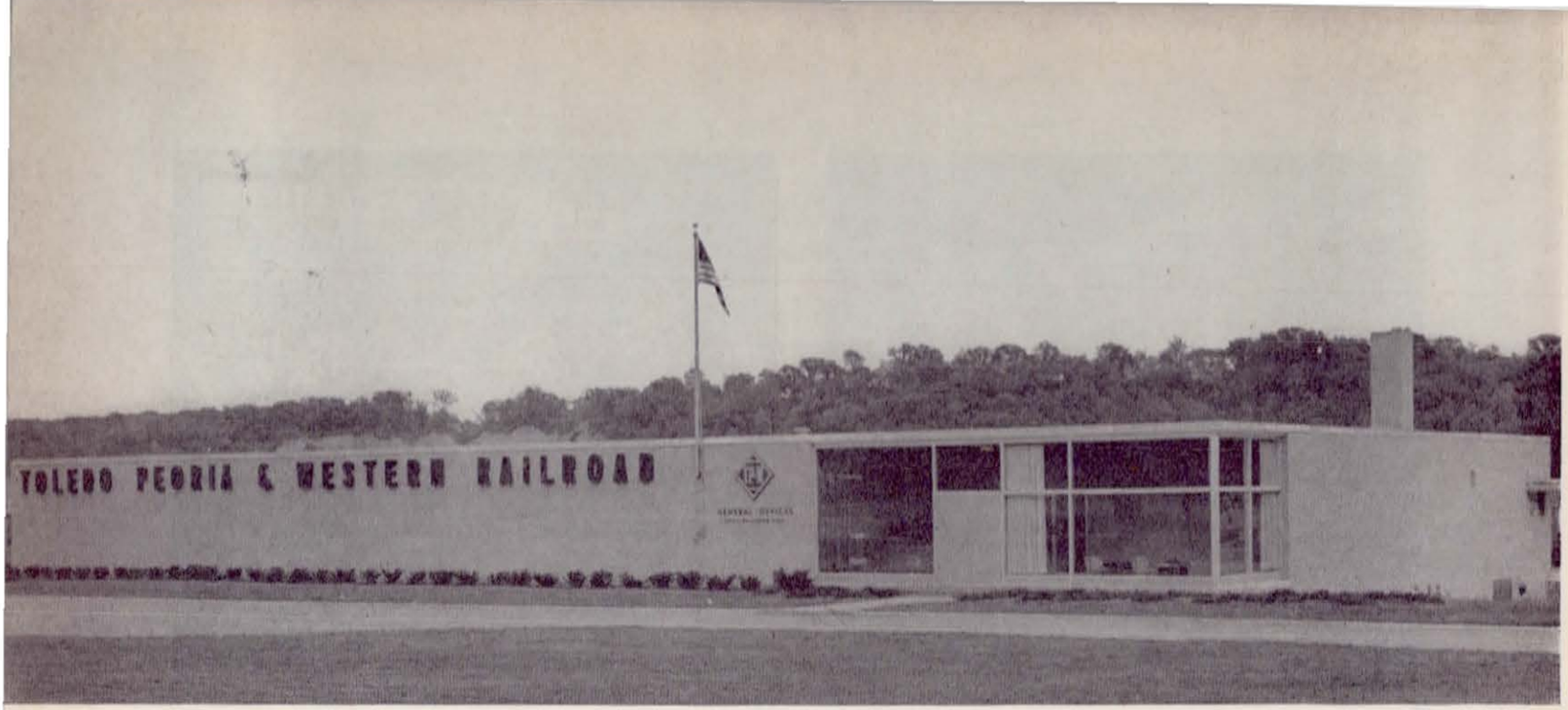
Their net railway operating income in July amounted to $11,623,997, compared with $39,093,694 in July 1950. Those same roads in the seven months

(Continued on page 55)

MORE NEWS ON PAGE 55

Additional general news appears on page 55 followed by regular news departments, which begin on the following pages:

Organizations	58
Equipment & Supplies	62
Supply Trade	62
Construction	62
Financial	67
Car Service	67
Railway Officers	68



The T. P. & W.'s new headquarters as seen from U. S. Highway 24. The large plate-glass area forms two walls of the reception room

What! Offices Without Windows?

The new administration building of the T.P.&W. at Peoria departs from conventional practice in many respects

The individual offices are well lighted, air conditioned and acoustically treated. Each wall is painted in a different, though harmonizing color. In the background in this view is the exterior wall of the building

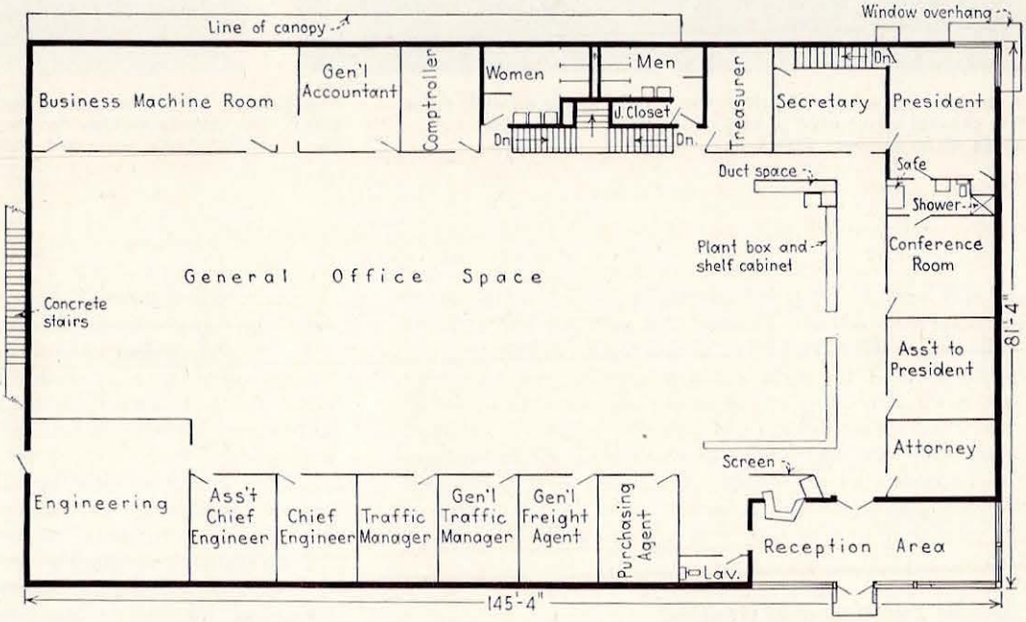
When its rented administrative offices in the old Union Depot at Peoria, Ill., became inadequate for the operation of a progressive railroad, the Toledo, Peoria & Western decided to construct its own general office building. It was further decided, in the interest of maximum efficiency, to consolidate its entire administrative organization in the one building.

Other stipulations established for the new structure were that it must be capable of expansion to meet the needs of increasing business; be as fire-resistant as possible; be pleasant and invigorating as a place of work; have adequate storage space; be economical to keep clean, maintain and operate; and be modern in appearance and setting so that it would be an asset to the community in which it is located. To realize all of these objectives it was necessary to discard tradition and stereotyped thinking in designing the structure. In spite of its many advanced features the cost of the building was only $250,000.

The new general office building is on U. S. Highway 24 adjacent to the T. P. & W.'s yards and shops at Peoria. The structure is a one-story concrete-block building, measuring approximately 81 ft. by 145 ft. and is faced with brick. It has a full basement. The grounds are graded and landscaped so the main floor is at ground level in front of the building, where the main entrance is reached by a driveway, while the ground in the rear is at the basement level. There are two parking areas, one for visitors at the front and the other for employees at the rear of the building.

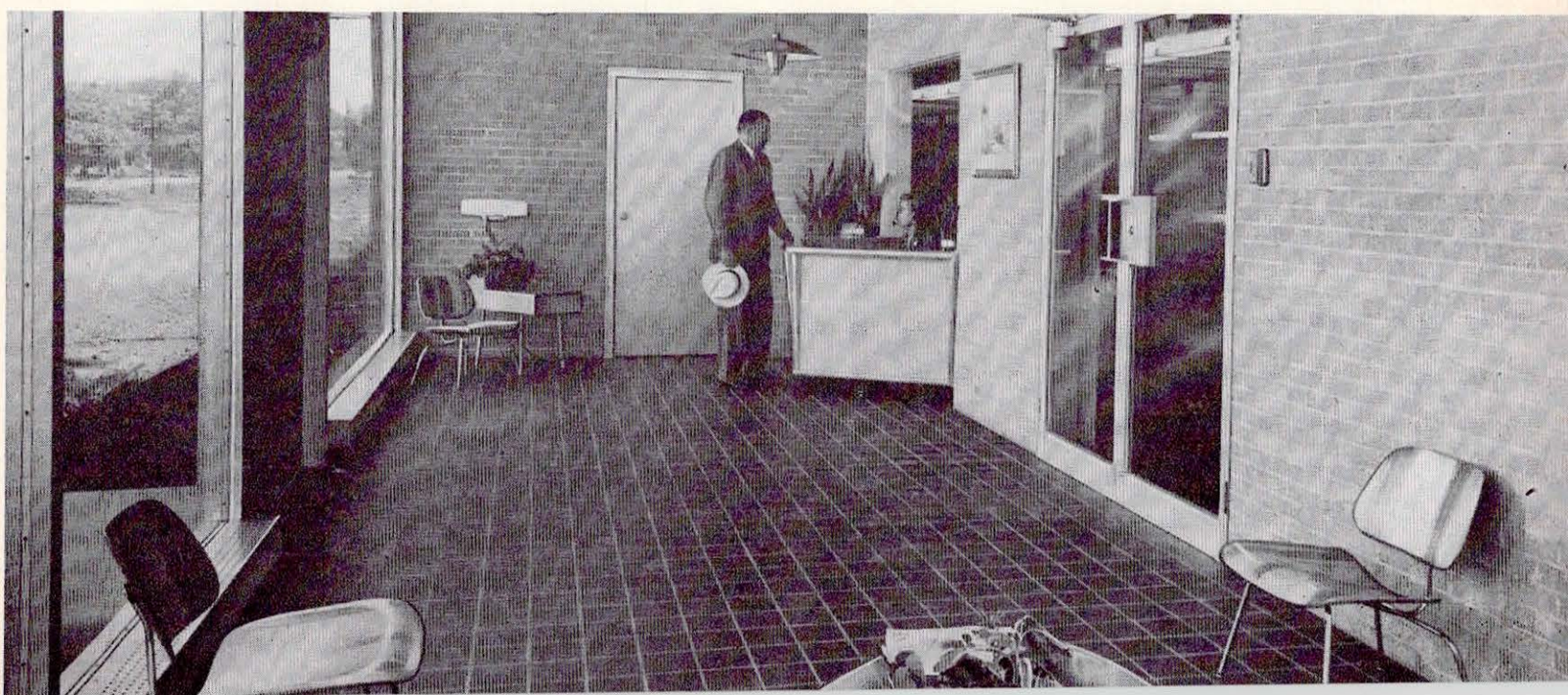
The structure has a structural-steel frame in which the supporting columns are arranged to form 20-ft. by 20-ft. bays. In the basement level, the columns are fire-

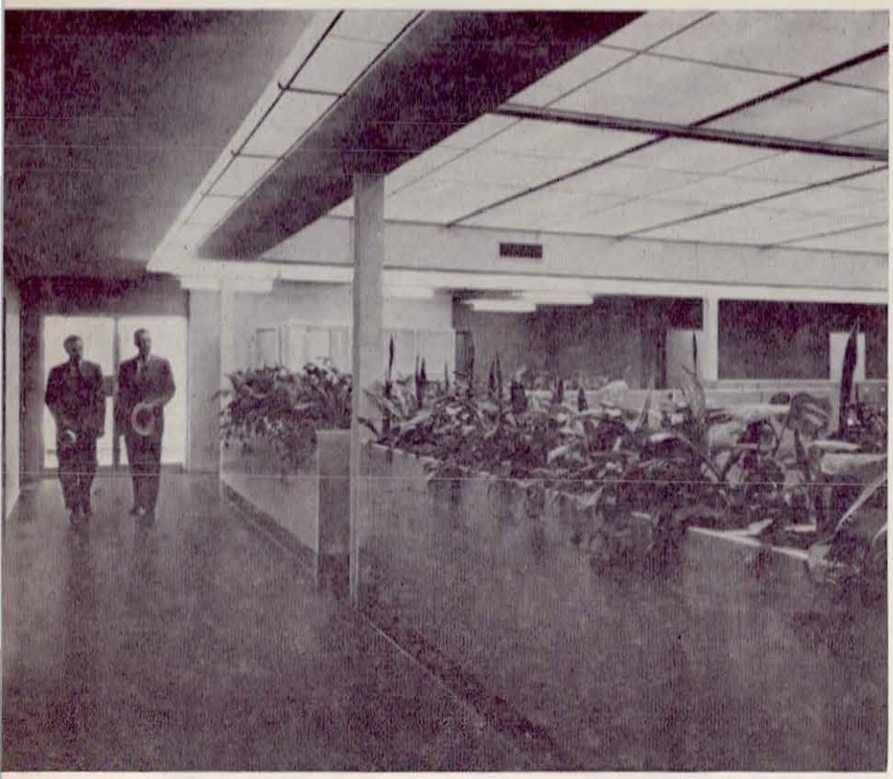
Rear view of building, from parking lot, showing the employees' private entrance (left center) and the plate-glass walls of the lunch room on the lower level. Small corner window at the left is only one on main office level except those in the reception room. Window plan helped achieve correct lighting, uniform temperature and economical heating



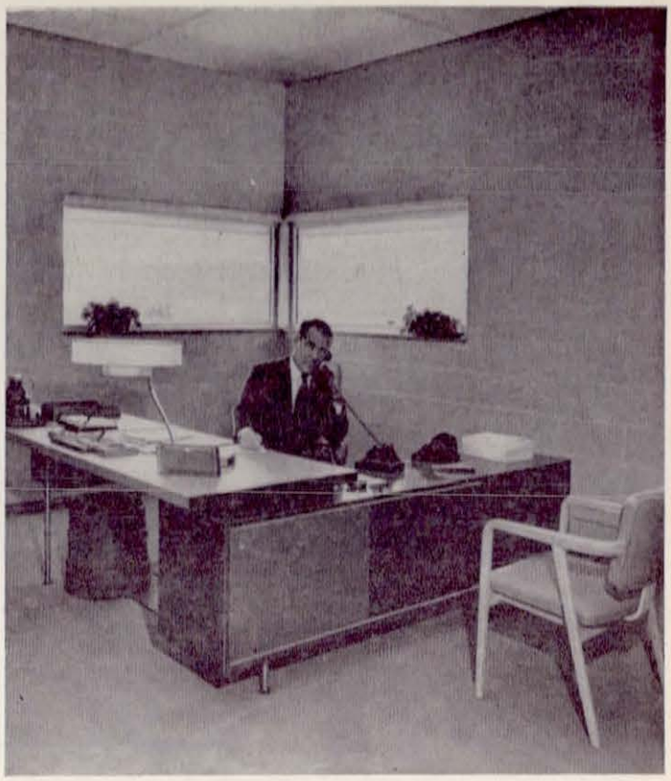
Floor plan of the main level of the new administration building. It is air-conditioned and has narrow partitions that can be moved economically if required

Callers find that there is no hardship in waiting in this reception room





A modern and extremely attractive way to divide an aisle from the general office area is by live plants which also give something of an outdoor atmosphere



President J. R. Coulter has a modern L-shaped desk in his office. The double window in the corner enables him to see much of the road's yard and shop area at this point

proofed with metal lath and plaster, while on the main floor the steel was left exposed and painted. The exterior walls are of the cavity-type, with a 2-in. insulating space between the 6-in. light concrete blocks and the 4-in. face brick. The floor on the main office level is of mesh-reinforced concrete, 2 inches thick, supported on steel joists and surfaced with linoleum tile, while that on the basement level consists of a 4-in. mesh-reinforced concrete slab placed on a backer board over 4 inches of gravel. The floors on this level are surfaced with asphalt tile.

Special Lighting and Heating

One of the striking features of the new building is the absence of fenestration. Except for the large plate-glass panels forming two sides of the reception room and one wall of the lunch room (basement level), only one room in the entire building has a window, this being the president's office which has a double window at the corner to enable him to see the yard and check the number and length of trains moving through it. The purpose in omitting windows was not just to make this building different from others, but to achieve three basic advantages—correct lighting, uniform temperature, and economical heating.

In general, the lighting of the individual offices and of the aisles on three sides of the center general office area (see floor plan) is furnished by banks of fluorescent lamps in frosted-glass fixtures. Two of the rooms, i.e., the president's office and the conference room, are lighted with fluorescent lamps beneath which plastic louvers are suspended to cover the entire ceiling. The light is thus so thoroughly diffused that it is reported that a pencil point touched to paper will not cast a shadow.

A different system of lighting was installed over the general office area by mounting 8-ft. fluorescent strip lights at 32-in. centers on the underside of a Fiberglas ceiling and creating a special glare-resisting effect by suspending 4-ft. by 8-ft. sheets of 9-gage diamond-mesh expanded metal beneath the lights. This system of illumination delivers 50 footcandles of light uniformly over the entire working area; no desk lamps are required.

Temperatures within the building are kept uniform by an air-conditioning system. The air-conditioning equipment, installed in one corner of the basement, uses an evaporative condenser, which is screened on the outside of the building by shrubbery and a grade change. All air within the building is filtered and either cooled by a compressor or tempered by a steam blast coil, as conditions require. The treated air is delivered to all parts of the building by a system of concealed overhead ducts. A manually adjustable damper permits the proportion of outdoor air to recirculated air to be varied as desired. Returns are achieved without waste of floor space by setting the front (door-end) partitions of all individual offices on a structural-steel Z-section covering a continuous floor slot.

Another important benefit of the windowless walls is that they permit the dividing partitions to be moved about as required. To achieve this flexibility in the sizes of the individual offices, it was necessary to provide continuous floors and ceilings and non-load-bearing partitions. The partitions are 1½ in. thick and are of metal lath and plaster. Because of their limited thickness, standard light switches could not be set in the partitions,

With all new metal furniture, adequate light without shadows, and judicious use of color, the general office area offers optimum working conditions for employees

Employees can relax in this lunch room while eating meals provided at cost from a well-equipped kitchen. Both rooms are in the basement of the building

so special low-voltage switches, connected to relays, were devised. One advantage of the thin partitions is that they saved several hundred square feet of floor space.

It is reported that the men occupying the individual offices like the exterior wall the best, for, being of concrete block and painted, its rough surface texture has excellent acoustical qualities, absorbing 50 per cent of the sound that falls on it. A further reduction in noise is provided by sound-absorbent ceiling.

To help create a quiet working atmosphere in the general-office area, the business machines are placed in a separate room. This room is divided into two sections by a glass control window. Business machines in the larger section operate without disturbing the occupants of adjoining rooms.

The theory of color dynamics was used in selecting the color scheme for the interior of the building. It is unusual to see less than four colors from any one viewpoint, difficult to see only two, and impossible to see only one. It is said that the variety of colors affords a refreshing contrast to white-and-black paper work.

Easy Housekeeping

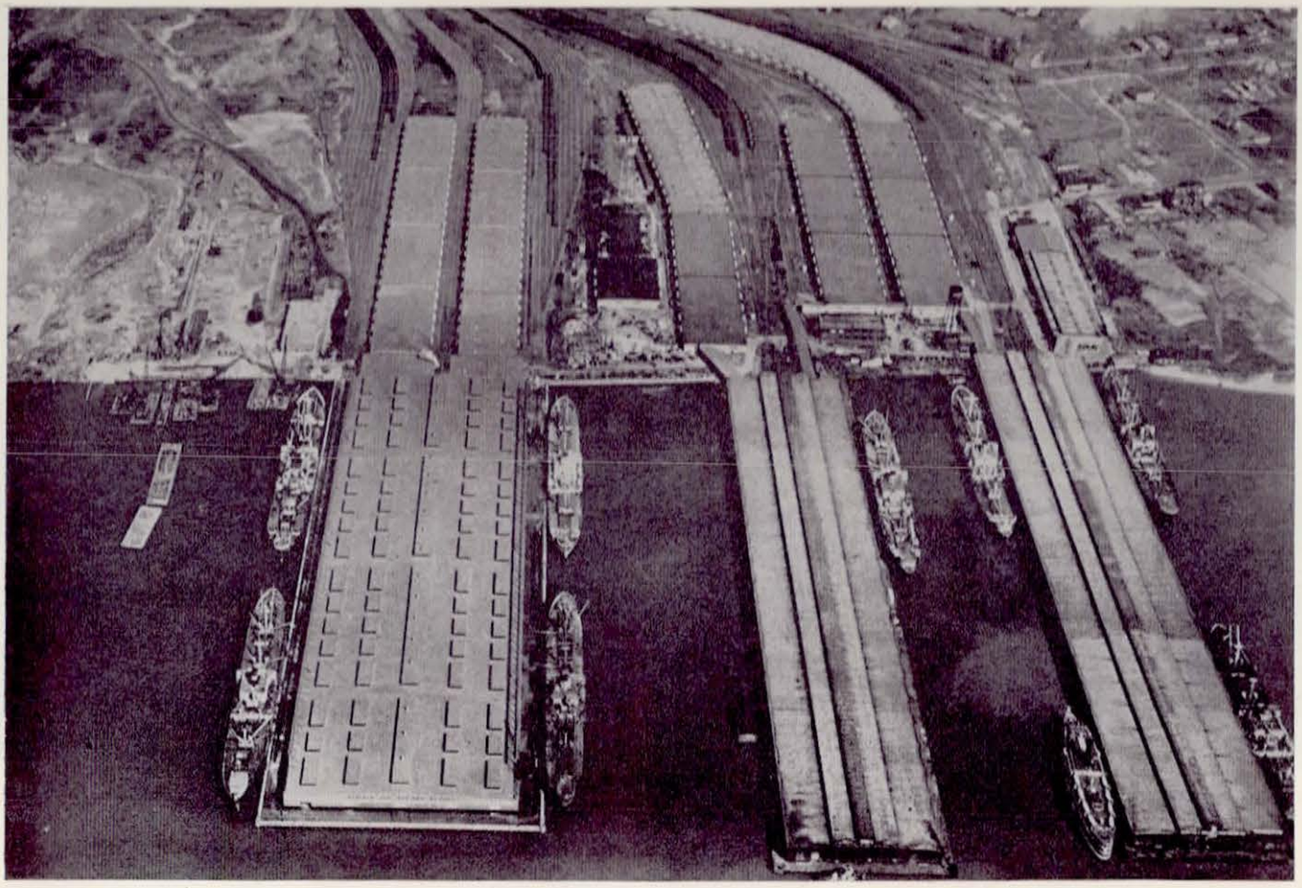
Great effort was used not only to create a pleasing atmosphere for smooth and efficient work but also to promote easy housekeeping. New metal furniture—including executive-type and standard desks, typewriter desks, chairs, bookcases and file cabinets—was installed throughout the main office. All non-current files and stationery stock are stored in basement rooms. Live plants were placed on a shelf and cabinet to form a division between one of the aisles and the general office area.

All employees were assigned separate lockers for keeping their wraps and lunches so that the main office presents an orderly appearance. These lockers are installed in the basement level near the employees' private rear entrance from the parking lot. Also, a lunch room and well-equipped kitchen are located in the basement level. The telephone switchboard is at the receptionist's desk but the equipment is out of sight in a basement room.

Fixtures in the toilet rooms are of Crane's finest quality. Water closets and lavatories are wall-supported so that the floors may be easily and thoroughly cleaned. The women's toilet room has one of Standard's newest straddle-type urinals which is enclosed in a compartment for privacy. Toilet partitions are Weiss ferro-enamel and are of the suspended type to facilitate cleaning. Each lavatory is equipped with an individual soap dispenser mounted by drilling into the lavatory so that it discharges directly into the bowl. A special stainless-steel paper towel dispenser and used-towel device is built into a wall of each toilet room.

The floors of the toilet rooms are of ceramic tile, while the walls are of glazed tile. The rooms are vented by fans mounted in furred spaces in the exterior walls. A large closet is provided for the janitor's equipment.

The T. P. & W. is proud of its new administrative building and believes it to be as modern as any office building erected by private industry and more advanced than most. This building was designed and the furnishings were selected under the personal direction of J. Russell Coulter, president of the T. P. & W. The firm of Carter E. Hewitt was the architect for the structure. H. H. Main, chief engineer, and R. H. Egbert, assistant chief engineer, were in charge of the construction.



"Of all problems of transport administration which had to be solved during the war, orderly flow of export shipments from points of origin within the United States through ports and thence overseas was in many respects the most critical"

Successful Wartime Railroad Management

—An Appraisal Based on World War II

We are a peace-loving people. We like to think that peace is "normal." But if you reflect on the past 50 years, you must conclude that war—or threat of war—has been the more "normal" status.

Hence, Americans have to learn to live in an economy which is—more frequently than not—in, or on the verge of, armed conflict. This is particularly so for railroaders, since their business is, more than most industries, an integral part of the country's armed might.

Study of the past is an indispensable part of planning for the future. For the benefit of the Lexington Group (composed of persons interested in railroad history, and affiliated with the American Historical Association) Professor Ballantine made a thorough study of the administration of the railroads in World War II and set forth his observations in a formal paper.

***Railway Age* has his kind permission to reproduce important portions of that paper and presents them in the belief that such an objective analysis, by a trained scholar of high standing, constitutes a timely and useful guide for problems with which the country is already grappling.**

By DUNCAN S. BALLANTINE

Associate Professor of Economic History, Massachusetts Institute of Technology

Railway administration in a war economy is properly a branch of logistics—the function of making materially possible that which is strategically desirable. This does not mean to imply that in wartime railroads should be militarized or that military traffic is in any sense the only legitimate demand for railway service. It does mean that in wartime the railroads must be responsive to all the exigencies of war, and that the problems of wartime railway administration will take their character directly from the kind of war we are fighting and the way we are fighting it.

The salient fact about World War II, from the point of view of the United States, was the magnitude of the material effort in which this nation was engaged. Be-

sides training and equipping our own forces—land, sea, air, and amphibious—we constructed a new merchant marine, supported our allies through Lend-Lease, and maintained our civil population—an effort which in the terms of the economist raised our gross national product from approximately $100 billion in 1940 to $213 billion in 1945.

The effects of this scale of economic activity upon the size of the railroad task can be readily imagined. In 1944 revenue ton-miles of all Class I railroads in the United States totaled 740 billion, 64 per cent above the previous historical peak of 1929. In the same year passenger-miles totaled 95 billion, 102 per cent above the previous peak of 1920. In part, these figures reflect expansion in the categories of service which had customarily fallen to the railroads. In no small measure, however, they also reflect the effects of both military action and wartime shortages of materials upon other media of transport and the consequent shift of burden from these types of carrier service to the railroad. Shortages of rubber and gasoline brought about a decline, both relative and absolute, in the amount of traffic borne by motor carriers. In addition, the action of German submarines along our Atlantic and Gulf coasts early in 1942 brought about a virtual cessation of coastwise shipping and imposed new tonnage loads upon the railroads.

As a consequence the railroads' share in the intercity movement of freight by all types of carriers rose from an average of slightly over 60 per cent during the decade of the Thirties to a wartime peak of 72 per cent. Their share of passenger traffic rose from a previous average of 9 per cent to a peak of 35 per cent. *It is particularly worthy of note that 87 per cent of the total increment of wartime freight traffic was absorbed by the railroads.*

Export Traffic Boomed

A second important characteristic of the war which bore upon the problem of railway administration was the great increase in export traffic. We were for the first time involved in a two-front war which entailed a maximum utilization of port and terminal facilities on all our coasts. During World War I, an increase in rail export tonnage of only 3 per cent between April and December of 1917 resulted, under gross mismanagement, in a major traffic crisis behind the eastern seaboard ports. Between 1940 and the wartime peak of 1944 car unloadings of export freight increased for the country as a whole 233 per cent; for all West Coast ports, 1319 per cent; for the Port of San Francisco, 1405 per cent.

In summary, then, the massive, overseas, two-front campaigns of World War II raised rail traffic loads within the United States to unprecedented peaks. The suspension of Atlantic coastal shipping and the shortages of rubber and gasoline threw additional burdens upon the railroads. Normal patterns of traffic flow were disrupted. The western territory, with its emphasis upon feeder systems oriented largely to the east, found itself struggling with problems of westward line-haul movements and terminal congestion. As military schedules became more and more the arbiter of traffic requirements, seasonal patterns were also disrupted.

In this situation, if a repetition of the first war's experience was to be avoided, it was clear that every railroad in the nation's network had to produce more service under more difficult conditions than had ever been experienced before. But it was more than a job for single railroads operating independently, with no matter how much devotion and efficiency. The problems of war transport were national problems.

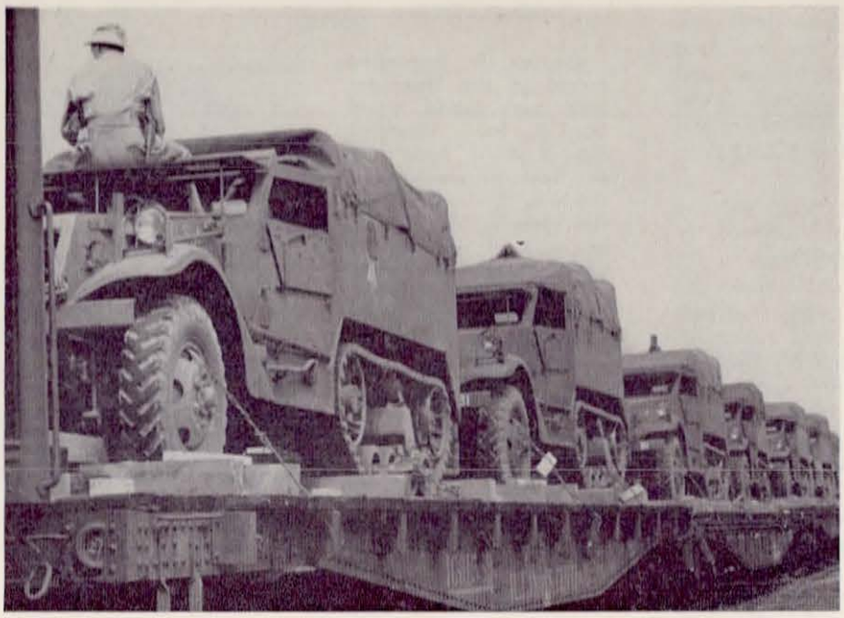
Duncan S. Ballantine served in the Navy for four years during World War II, being mustered out of active duty with the rank of commander, U.S.N.R. He served for two years as historian on the staff of the chief of naval operations, during which time he studied naval logistic organization and procedures. He is author of the book, "U.S. Naval Logistics in the Second World War," published by Princeton University Press in 1947, and of various articles on naval transportation.

At first glance it might appear that such a staggering task would require an equally staggering organization to perform it. Happily no such organization ever came into existence. *The remarkable feature of our administration of railroads in World War II was its lack of emphasis upon organization per se; its readiness to utilize, instead of replace, existing methods of industry coordination; and its very moderate exercise of the extensive wartime powers of coercion which were available.* Indeed, in contrast to the monolithic character of the task it had to do, the organization of transport administration was a curiously variegated combination of public and private agencies. While all of the essential administrative functions just outlined were performed, they were not necessarily performed by a single, centralized agency.

At the top and center of the system stood the Office of Defense Transportation, created by Executive Order on December 18, 1941. The O.D.T. was conceived primarily as an agency for traffic supervision and coordination and as a liaison between the transport industry and other war agencies. Its functions did not, therefore, seriously overlap those of the Interstate Commerce Commission with respect to such matters as rates, finance, working conditions, safety, and other normal concerns of the commission.

On the civilian side, there existed two agencies whose contributions to the wartime transport administration were of incalculable importance. These were the 13 regional shippers advisory boards, and the Car Service Division of the Association of American Railroads. One cannot emphasize too strongly the importance of the system developed by them—its methods of communication, its network of field agencies, its practiced techniques and personal contacts. Most of all, it inculcated in both shippers and railroad men a sense of collective responsibility for the movement of goods wherever and whenever they might be needed—proprietary interests being relegated to a secondary position.

I have elected here to concentrate upon two problems of World War II which might be expected to recur in any future war in which we are involved. One is the maintenance of sufficient capacity in the railroad system—a problem which even today presses for radical solutions. The other is the control of export traffic through the ports, which is the point at which considerations of



Left—"Railway administration in a war economy is properly a branch of logistics"

Right—Long-term improvements in American railroad operating techniques . . . "were stimulated by the heavy investment program begun by the railroads in 1923"

a military and logistic nature touch most closely upon the operation of the railroad system.

Problem of Capacity

It has been pointed out frequently that our railroads entered World War II with fewer freight cars and locomotives and—despite the increased size of individual freight car units—with less aggregate capacity than in either the first war or 1929, the historical peak of freight traffic volume. During the war period, and particularly until the spring of 1943, the railroads encountered great difficulty in securing more than nominal additions to existing equipment. Taking freight cars again as an example, the railroads received in 1942 only 34 per cent of their essential requirements as stated by the O.D.T.; in 1943 only 41 per cent; and in 1944, 66 per cent.

One reason, of course, for this ungenerous response was the general shortage of raw materials which existed throughout the war economy. With the establishment of the War Production Board's Controlled Materials Plan early in 1943, this situation was somewhat eased by improved administration, and it is noteworthy that, by the end of 1943, the O.D.T. was the largest claimant of controlled materials outside of the military services and the Maritime Commission. Until that time, however, the O.D.T. was compelled to submit its requirements through the Office of Civilian Supply. That office systematically and arbitrarily cut back the O.D.T. estimates, despite the fact that they were supported by the War and Navy Departments. The War Production Board too lacked a clear understanding of the role of the railroads in the war effort, inclining to the view that their claims for materials and equipment should be dealt with as any other civilian need.

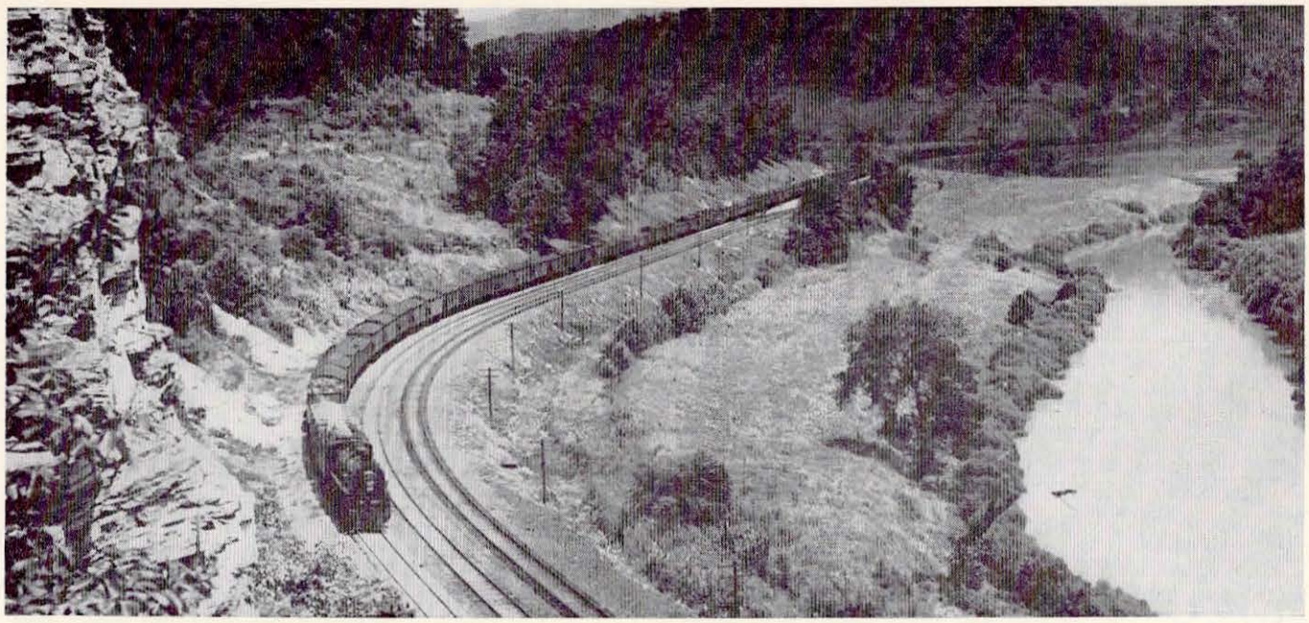
In brief, in their efforts to meet the rising demands for transport service the railroads were compelled to rely substantially upon the equipment they possessed at the outbreak of the war. Additional capacity had to be secured, therefore, through increased utilization of existing rolling stock, tighter traffic management, and higher operating standards. The statistics of operating performance during the war years bear out the conclusion that the ability of the nation's railroad system to meet the demands imposed upon it was in large part ascribable to improved operating standards by individual railroads and to the improved traffic management and shipper-carrier coordination achieved jointly by O.D.T., shippers boards, and Car Service Division.

Further credit for the increased use of railroad plant capacity must, I think, be divided two ways. First, we should take notice of the long-term improvements in American railroad operating technique, which were stimulated by the heavy investment program begun by the railroads in 1923. Among many improvements, the addition of 13 million tons of heavier rail, almost 10,000 miles of centralized traffic control, 11,000 miles of automatic block signals, radio communication with moving trains and yard engines, and mechanization in yards and terminals enabled the existing equipment to achieve a much higher ratio of ton-mile service than heretofore.

With the outbreak of the war, however, much fuller utilization of capacity had to be achieved if increasing demands for transport were to be met. One approach was to intensify repair and maintenance activities and thus reduce the percentage of "bad order" or unserviceable cars and locomotives. Despite the fact that an increasing percentage of the rolling stock was off its home lines as the defense and mobilization programs were expanded, the number of unserviceable cars and locomotives was steadily reduced. In September, 1939, "bad order" cars constituted over 13 per cent of the total; by January, 1943, this figure had been reduced to 2.4 per cent.

A second approach was to avoid the wastage of space through increased loadings of cars. To this end O.D.T. General Order No. 1, effective May 1, 1942, established minimum loading requirements for less-than-carload freight of ten tons per car (50 tons being the average capacity of a freight car). In November, 1942, the O.D.T. prohibited the dispatch of any car carrying carload freight of less quantity than the marked capacity of the car. Numerous exceptions had to be made later in the application of these two orders—as for example, in cases where the lack of freight in regions of car surplus might delay the movements of cars to regions of shortage.

Various other devices, such as increased demurrage



rates, authorization and insistence upon pooling, restriction of the use of railroad cars within municipal limits, and careful policing of performance reports by the O.D.T., also contributed to the ends envisaged in these general orders. As a result the average loading of carload freight rose from about 38 tons per car in 1941 to slightly over 41 tons in 1943. The combined effects of these two orders were equivalent to the addition of 200,000 units, or more than 10 per cent to the nation's freight car supply.

Control of Port Traffic

Of all the problems of transport administration which had to be solved during the war, the orderly flow of export shipments from points of origin within the United States through the ports and thence overseas was in many respects the most critical. Here, of course, the most serious breakdown had occurred during the first war. Here too we see most clearly the need for coordination between all the sequential phases of transportation. It is here finally that the real test is made of the cooperation between shipper and carrier, a test which is particularly severe in the movement of military goods, where abnormal conditions of urgency are often regarded as normal.

Persons engaged in transportation are prone to forget sometimes that transport is not an end in itself. The object of transport is to move goods, and it becomes therefore in any system of logistics an adjunct, albeit an essential and vital one, of the general system of supply. Supply requirements, in turn, have their origin in the military situation that prevails in the operational theater. But the military situation itself is one of the most unpredictable phenomena in human experience. Either an unexpected defeat or an unexpected victory may so alter the pattern of supply requirements that serious dislocation will result back through all phases of the logistic system. It is the duty of supply administration therefore to meet these changing requirements while at the same time imposing the least possible shock upon the systems of production and transport which underlie supply.

But the shocks and heartaches to which the transport system is subject come not only from changing supply requirements. They come also from within the system itself.

Clearly the responsibility for the efficient flow of cargo through the port does not rest with the railroads alone. It is a matter of shipping control, port operations, storage procedure and supply control as well as railroad traffic management. In brief, it is a logistics task. Yet from the point of view both of movement through the port and of the efficient operation of the rail transport system itself control of rail traffic into the ports is of vital concern.

With America's entrance into the war the situation which had been slowly building up became suddenly more acute, as every agency having cargo for export began to order it forward. As a result early in 1942, serious congestion began to develop at various ports—particularly New York, Philadelphia, and San Francisco. In March, agreement was reached between the War Department, O.D.T. and the War Shipping Administration upon a system of overall control, which required, however, several months before it could be put fully into operation.

The control system, as it came into effect early that summer, consisted of two parts. First, through a Transportation Control Committee, representing the major agencies concerned, block releases of export freight were issued, indicating the maximum tonnage which might be shipped to a given port during any month. Within these block release allocations unit permits were issued by the various exporting agencies to which the block releases had been assigned—the Army, Navy, and the British Ministry of War Transport. The W.S.A. received the block releases for commercial shipments, but turned over their actual administration to the Car Service Division.

The T.C.C. did not limit its centralized supervision to the monthly issuance of block releases. It met daily in order to review unit shipment authorizations on the basis of current port and shipping conditions. Through its operations there was provided a greater certainty that before rail shipments were authorized the necessary conditions for the prompt unloading and release of freight cars would be fulfilled.

Even so, the system of movement control would not

in itself have been sufficient to maintain an orderly flow into the ports, for the pressures exerted upon traffic channels came as much from the piling up of goods awaiting shipment within the country as from the limited capacity of the ports to transship them. A system relying wholly upon embargoes would simply transfer the pressures backwards to points only a little less vulnerable.

The solution to this problem was the development behind the major ports of a series of transit storage centers, designated by the War Department as holding and reconsignment points. Their purpose was to act as temporary "surge chambers," into which cargoes moving toward the ports could be diverted, or if necessary pulled back from the ports, whenever congestion threatened. The "h. & r." points were intended for in-transit, not permanent storage. The general criterion was to turn over shipments consigned to these points within a period of 60 days, and therefore, no supplies were admitted to them for which there was not a strong likelihood of early release.

The success of the export control system can be seen in the fact that the average period during which railroad cars were detained in port areas before unloading dropped from eleven days in January 1942, to not over seven days from April 1943 until the end of the war. These general averages do not, of course, indicate cases of local and temporary congestion, which did occur, but at no time after the early months of 1942 was there a general crisis of port congestion or shortage of freight cars resulting therefrom.

The general success in controlling movements to the ports should not obscure certain shortcomings which existed in the system. For one thing, the estimates of freight to be shipped, upon which the monthly block release allocations were based, were often unreliable. This stricture does not apply to estimates of commercial ladings which were furnished by the various regional shippers advisory boards. It does apply in some measure to the Army and somewhat more to the Navy, which never during the war developed a system of centralized traffic control.

"Grounds for Self-Congratulation"

In summary, the record of the American railroads and of the national transport administration during World War II affords grounds for self-congratulation, but not for complacency. In the first place, since the second world war was fought on foreign soil, except for submarine attacks upon our coastal shipping, there was no disruption of our domestic transport system caused by enemy action. Secondly, at the time of Hiroshima, Pacific export programs were severely straining not only the terminal, but also the line-haul capacity of the western district. Indeed, there were many qualified observers of our transport system who regarded the prospect of a full-scale invasion of Japan with grave misgivings. Thirdly, although we were indeed stretching our industrial capacity beyond hitherto conceivable limits, we were fighting an enemy whose material resources and industrial potential were considerably less than ours. We could afford, and did in fact indulge ourselves in, something less than a total effort. This is not so true of the railroads, which were pushed harder with respect to potential capacity than most other parts of the economy. Finally, as stated earlier, we had the benefit of an interlude during which to push our preparedness.

With respect to each of these advantages which we enjoyed during the second world war the prospect immediately before us now is considerably less favorable. If then, we are to maintain a posture of logistic readiness for any eventuality, it would seem that building upon the accomplishments of the prewar and war periods we must look to those points in the transport system where failures did occur or where signs of serious strain had begun to appear.

Among the reasons for the success of the nation's rail transport system during the war we may cite the following:

(1) The system of traffic management supervision and control based upon the shipper-carrier cooperation of the Car Service Division and the shippers' boards

(2) The improvements in operating technique, which did much to offset the reductions which had taken place between the two wars in the crude physical capacity of the railroad plant

(3) Improvements in military supply and logistic procedure, which are best illustrated in the system of export traffic control previously described

(4) The system of organization represented by the O.D.T. and related agencies, which achieved a sound balance between centralized authority and supervision and decentralized responsibility for performance

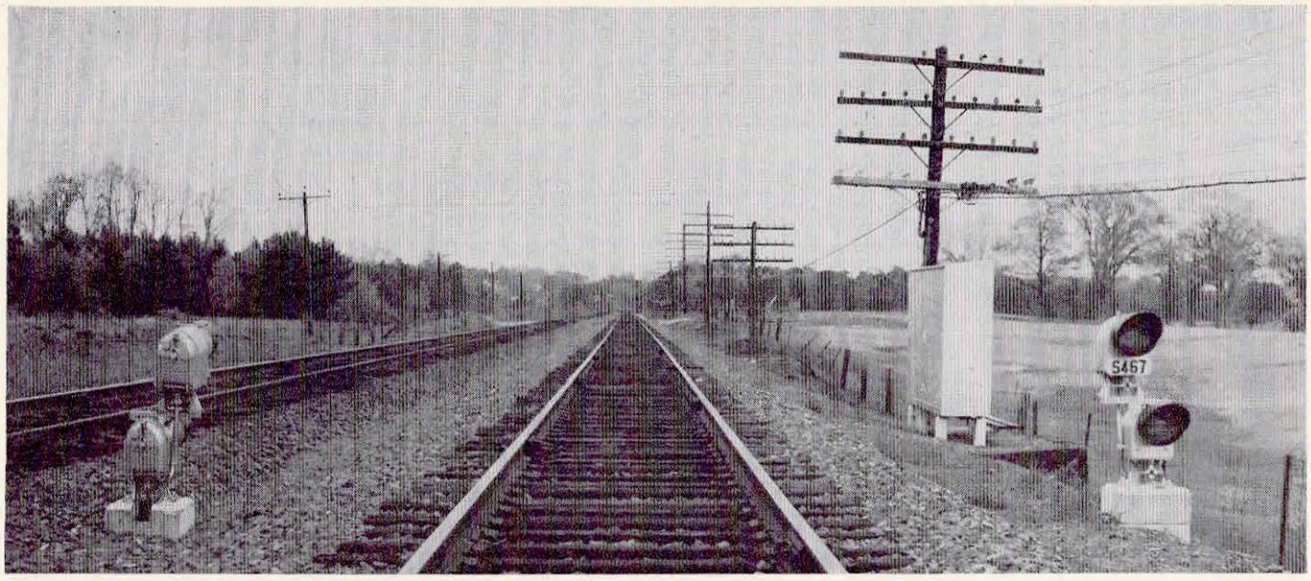
(5) The sense of collective responsibility which had grown up within the railroad industry before the war.

Yet to Be Done

Among the things that remain to be done, I would cite first the need to develop and maintain adequate capacity in the railroad plant itself, both in rolling stock and in fixed plant factors. The recent war demonstrated clearly that no substantial expansion of physical facilities can be expected once war production programs are fully under way. Recently the A.A.R. has been concentrating upon increase of freight car supply. The principal problem would appear to lie in the area of fixed plant improvements for which private investment capital has not generally been available.

Second among the things that need to be done is continued and intensified advance planning and working cooperation between transport agencies and all the service and supply branches of the Department of Defense. Here we must build upon the kinds of carrier-shipper cooperation developed earlier in the commercial neld. From this we might hope there would develop not only improved methods of transport of war materials, but also necessary modifications of the military supply systems themselves, which would take greater account of the needs and limitations of the transport system.

Finally, I would emphasize once again that the real test of logistics, and therefore of railroad administration, comes only when the channels of distribution are working at the limit of their capacity. As long as there exists some surplus of capacity, the problems of administration are different in kind as well as in degree. Since peacetime experiences will rarely duplicate the peculiar conditions of urgency, uncertainty, and all-out effort which are characteristic of war, there is a two-fold task for the historian and the railroad administrator. The historian might well concentrate attention upon those periods in our past experience such as the continuing acute shortages of 1906-07 when such critical conditions prevailed. By a much more difficult act of constructive imagination the administrator might attempt to visualize the crises of the future, drawing from the lessons of the past and also thinking forward from a well informed appraisal of the position in which we now are. By such teamwork, I believe, we could do much to place our railroads and our economy in a posture of readiness for the *next* war—not simply the last.



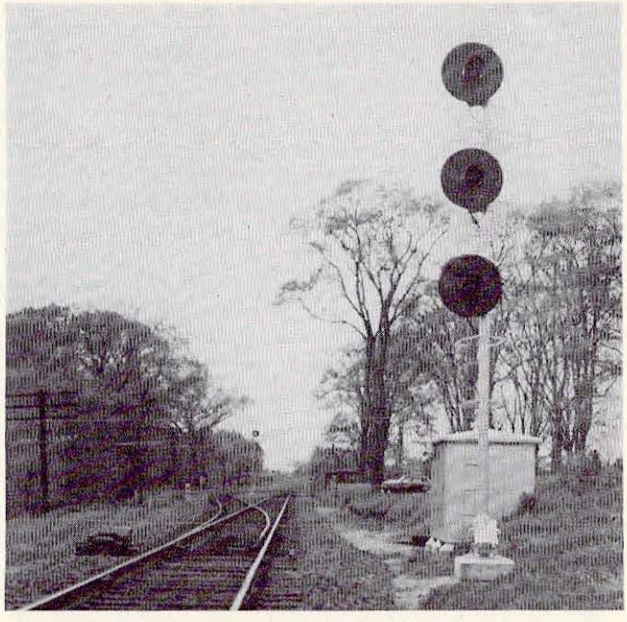
Signals at middle of siding save train time

How the B. & M. Eliminated 22 Miles Of Second Track

Centralized traffic control, with long sidings and special signaling, provides capacity for single track to handle 26 to 30 trains daily

Out of a total of 34 miles of double-track main line on the Boston & Maine between Nashua, N. H., and Concord, 22.4 miles has been converted to single track with centralized traffic control. Nashua is 39 miles northwest of Boston, and Concord is 34 miles farther in the same direction. Manchester, midway between Nashua and Concord, is an important manufacturing city and railroad traffic center. At Concord, there is a junction with three lines: (1) To Wells River, Vt., where the B. & M. connects with the Canadian Pacific for through train service between Boston and Montreal; (2) to White River Junction, Vt., where the B. & M. connects with the Central Vermont, also for through train service between Boston and Montreal; and (3) the Claremont branch of the B. & M. Throughout the Nashua-Concord territory, the railroad follows the Merrimack river with a low grade ascending northward. All factors contribute to train speeds up to 70 m.p.h. for passenger trains and 45 m.p.h. for freights.

Sixteen passenger trains, six freights and two milk trains are operated daily on the 16.7 miles between Nashua and Manchester, and 18 passenger trains, 6 freights and 2 milk trains on the 17.6 miles between Manchester and Concord. Including some extra trains, a total of 26 to 30 trains are operated daily.



C.T.C.-controlled signals at the end of a siding

Based on extensive experience with centralized traffic control on single track on other territories, the Boston & Maine decided to investigate the possibility of a change from double to single track on sections of the Nashua-Concord line. Investigation showed that the proposed change could be made without material loss of train time, providing long sidings were located as indicated by the studies. Action on this proposal was brought

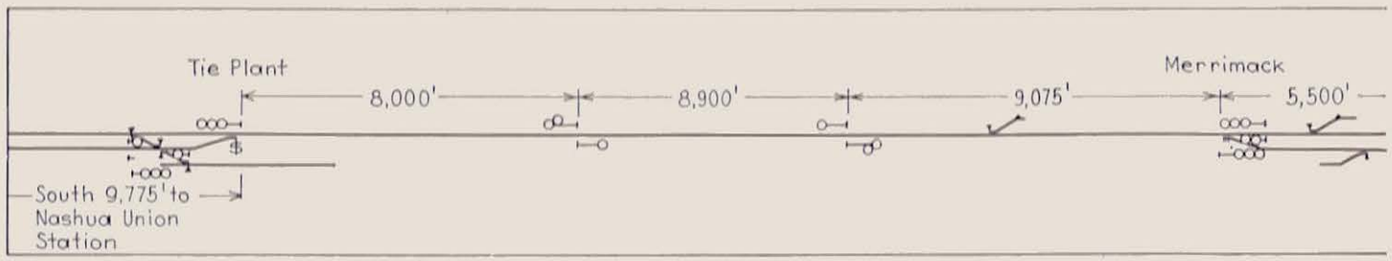


Fig. 1—Track and signal diagram of C.T.C. on the 13 miles

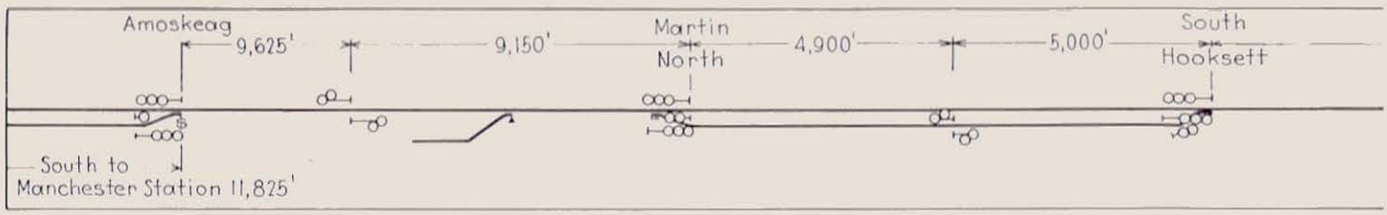


Fig. 2—Track and signal plan of C.T.C. on 13.4 miles

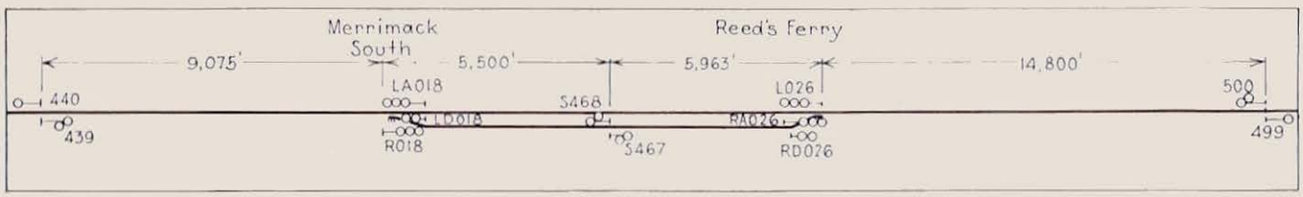


Fig. 3—Plan of signaling at a siding

about in 1950 because of the need for relay rail elsewhere on the railroad. Much of the rail to be taken up in the Nashua-Concord territory was 112-lb., laid in 1941 to 1944, and was in good condition for relaying in main-track service elsewhere. About 85 per cent of the ties were in good condition for reuse. Furthermore, to a certain extent, the crushed rock ballast is being picked up, cleaned and loaded on cars by machines, ready for use again at other places.

Sections Taken Up

There is a plant for treating ties at Tie Plant, 2 miles north of Nashua. Several switching moves are made between this plant and Nashua every day. For this reason, and also to provide plenty of track capacity through Nashua, the two main tracks were left in service from Nashua north to Tie Plant.

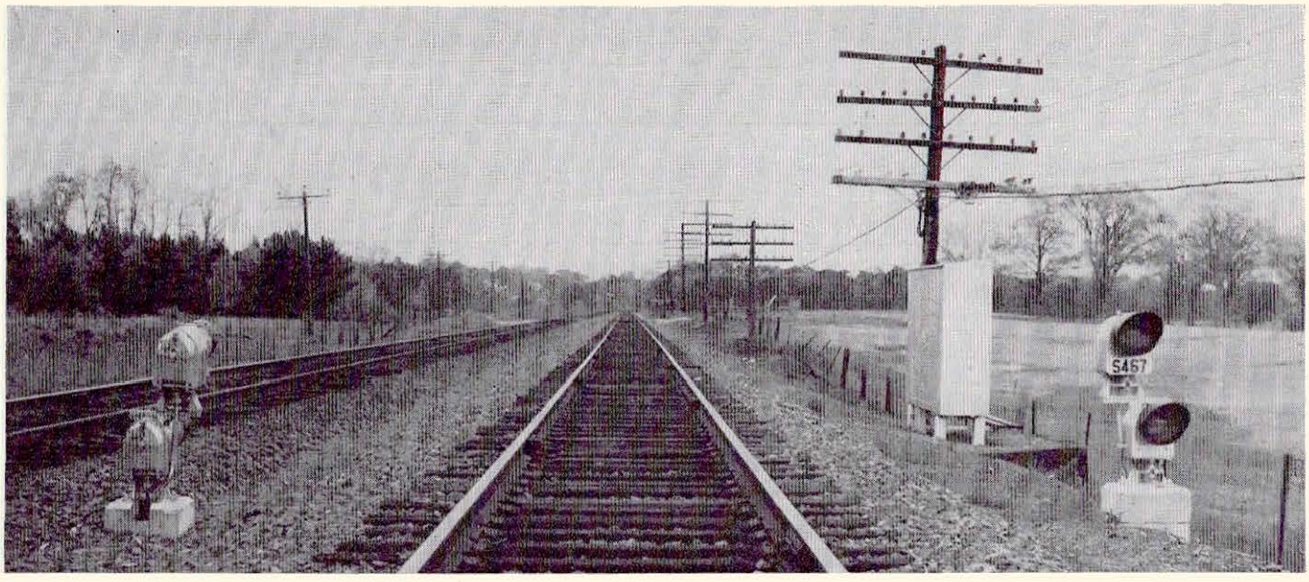
Manchester is an important junction point, with an extensive multiple-track layout, which was modernized in 1944. It was equipped at that time with a new extensive interlocking. This layout and local operating circumstances dictated the retention of double-track line from Manchester south to a new end-of-double-track switch at South Manchester, as shown on the plan. Between this end of double track and Tie Plant, mentioned above, 13 miles of new single-track main line replaces the previous double track. The detailed studies of train operations indicated that, in this 13 miles, there should be a siding in the vicinity of Merrimack. This siding was formed by leaving the previous northward main track in place between Merrimack South and Reed's Ferry. A factor in the selection of the exact location was the chance to include four industrial sidings, thereby allowing through trains to pass on one track while switching was being done on the other.

Conventional double track was retained in service from South Manchester northward through Manchester to Amoskeag, 2.2 miles north of the station at Manchester. In order to provide adequate track capacity for entering and leaving the terminal at Concord, conventional double track was retained from Concord station south for 2 miles to a new end of double track at Bow. Between Bow and the end of double track at Amoskeag there are 13.4 miles of new single-track main line, replacing the former double track. Studies of train operations indicated that in this 13.4 miles, a siding should be located about midway. To avoid highway crossings at grade within the length of the siding, it was located between Martin North and South Hooksett, which is somewhat south of the midpoint between Amoskeag and Bow.

Why the Sidings Are Long

Both the Merrimack siding and the Hooksett siding are two miles long. These sidings were made long to secure two advantages: (1) To increase the number of opportunities for trains to make running meets, in which neither train stops; and (2) to permit each siding, if necessary to hold two trains.

When making the track changes, new No. 20 turnouts with 30-ft. switch points were installed at the ends of the sidings so trains can enter or leave at speeds up to 30 m.p.h., thus minimizing the time required for such



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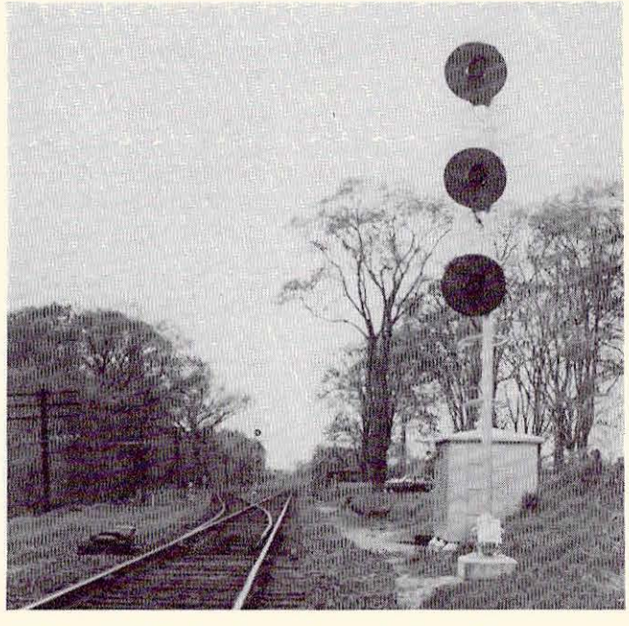

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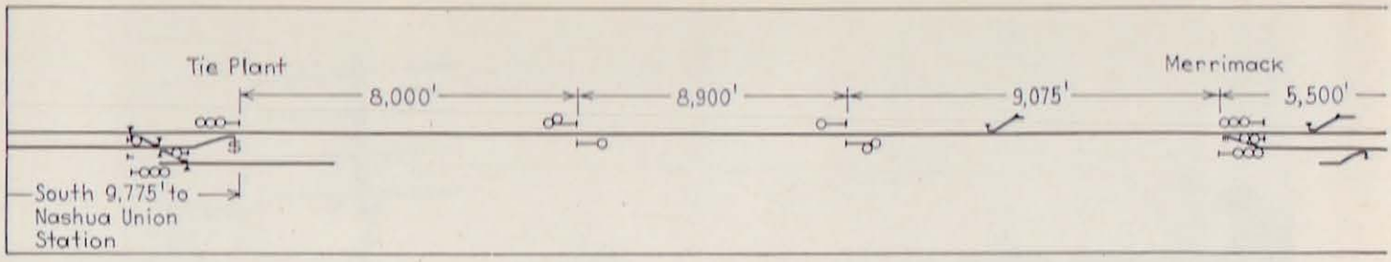

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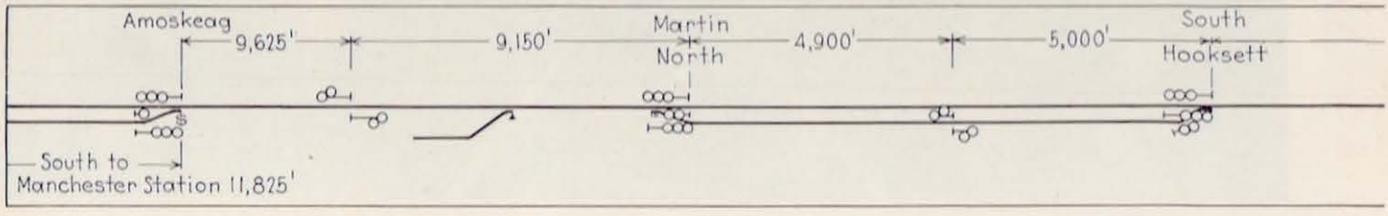

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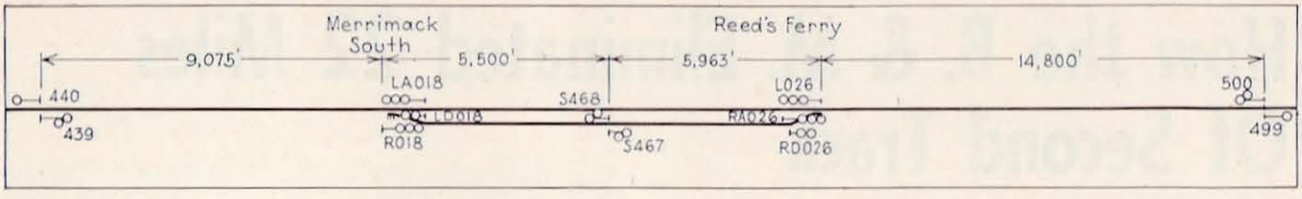

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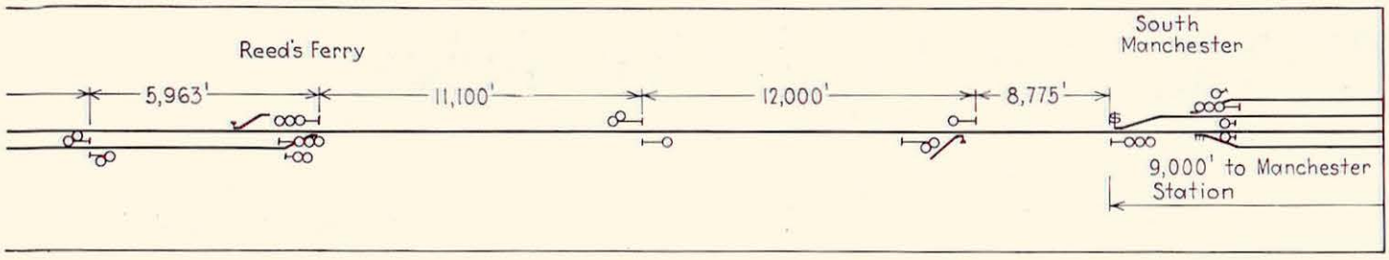
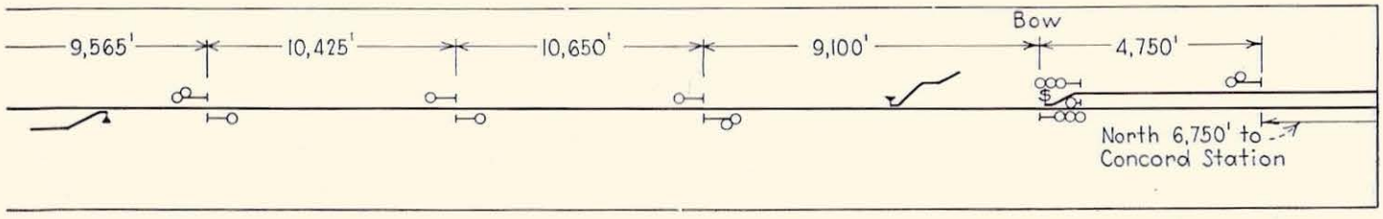


of single track between Tie Plant and South Manchester



of single track between Amoskeag and Concord

diverging moves. Of further importance is the fact that the signaling is specially arranged to direct trains to use these new turnouts and long sidings efficiently.

Track circuits on these sidings enter into the control of the signals. Fig. 3 shows the signaling at the Merrimack siding. At a midpoint on this siding, there is a double signal location consisting of two-unit automatic block dwarf signals. With no train on the siding, these intermediate siding signals are normally set to display the Approach aspect, yellow-over-red. If the switch is reversed for a northbound train to enter the siding, the station-entering signal R018 will display the Medium-Clear aspect, red-over-green-over-red. At the same time, the signal in approach, i.e., 439, displays the Approach-Medium aspect, yellow-over-green. Thus, these aspects on signal 439 and R018 give an engineman the information needed to bring his train up to and through the turnout and into the siding at the maximum permissible speed.

If a leading train has already occupied the far end of the siding, i.e., the segment between intermediate siding signal S467 and signal RD026, then signal S467 displays its most restrictive aspect, red-over-red, staggered, and the best aspect on signal R018, for a train to enter the siding, is Medium-Approach, red-over-yellow-over-red. An Approach-Medium aspect, yellow-over-green, is still obtained at signal 439, as there is sufficient braking distance for a train passing signal R018 at 30 m.p.h. to stop before reaching signal S467.

Leave-Siding Signals

When a northbound train on the siding is to depart, the switch is reversed, and the two-unit leave-siding dwarf RD026 is controlled to display the Medium-Clear aspect, green-over-red. If the train is south of the intermediate siding signal S467, that signal then displays the Approach-Medium aspect, yellow-over-green. The Medium-Clear aspect of leave-siding signal RD026 does not show, however, unless two or more automatic blocks ahead are unoccupied. If the intermediate signal 499 is at red, then the best aspect on RD026 is Slow-Approach, red-over-flashing yellow. If a northbound train has passed but is still occupying the block between signal RA026 and 499, with the switch reversed, leave-siding dwarf signal RD026 can be cleared to display the Restricting aspect which is red-over-yellow.

On a recent day, passenger trains 332 southbound and 313 northbound made a non-stop meet at Merrimack siding. The southbound train got in the clear at 4:35 p.m. At 4:36 p.m., the northbound train accepted the main track signal at the south end; it cleared the north switch at 4:38 p.m. The southbound train went through the siding in four minutes, clearing the south switch at 4:39 p.m. This is typical of many of the non-stop meets made in this territory.

Operation of Switches

The switches at the ends of the sidings are operated by Union Switch & Signal Style M22 d.c. switch machines, which are controlled as part of the C.T.C. system. Springhead rod type oil-buffer spring switch mechanisms, and Style T-20 switch stands, including automatic facing-point locks, also made by the Union Switch & Signal Division of Westinghouse Air Brake Company, were installed at each of the spring switches.

Control Machine at Manchester

As stated above, a modern interlocking controlling an extensive area through Manchester, was installed six years ago. For the control of the new C.T.C., a panel 2.5 ft. wide was added at each end of the interlocking machine. The levers, indication lamps, and other operating features of the C.T.C. panels are identical with those of the interlocking panel, so that in effect the operation is practically the same as if the interlocking had been extended 14.5 miles south to Tie Plant, and 15 miles north to Bow. This C.T.C. project was planned by the forces of the Boston & Maine, with the engineering detail plans furnished by the then Union Switch & Signal Co. and was installed under contract by the Union Switch & Signal Construction Co. The installation was made under the jurisdiction of E. N. Fox, engineer of signals and telegraph, and the field construction was under the direction of W. H. Williams, superintendent of construction for the signal company, and W. W. Hartzell, field engineer signals for the railroad.

1950 Railroad Construction Indices

The Engineering Section of the Interstate Commerce Commission's Bureau of Valuation has issued its Railroad Construction Indices for 1950, showing that last year's overall index for the country as a whole was 288, an increase of 6 points above 1949's 282.

The 1950 level was the highest in the history of the indices, which are weighted averages based on 1910-1914 costs as 100.

Indices of the country as a whole are shown in the accompanying table. The commission points out that the decrease in the composite equipment index is caused not by a decrease in the price level, but by greater weighting accorded diesels because of their growing importance.

"The indices," the statement says, "represent territorial index factors and are of value in indicating trends. They are not necessarily applicable for use in determination of reproduction costs upon individual railroads."

Accounts for which indices are shown are primary accounts which are designated in the Classification of Investment in Road and Equipment of Steam Roads, as follows:

I—ROAD:

1. Engineering
2½. Other Right of Way Expenditures
3. Grading
5. Tunnels and Subways
6. Bridges, Trestles, and Culverts
7. Elevated Structures
8. Ties
9. Rails
10. Other Track Material
11. Ballast
12. Tracklaying and Surfacing
13. Fences, Snowsheds, and Signs
16. Station and Office Buildings
17. Roadway Buildings
18. Water Stations
19. Fuel Stations
20. Shops and Engine Houses
21. Grain Elevators
22. Storage Warehouses
23. Wharves and Docks
24. Coal and Ore Wharves
26. Telegraph and Telephone Lines
27. Signals and Interlockers
29. Power Plants
31. Power Transmission Systems
35. Miscellaneous Structures
37. Roadway Machines
38. Roadway Small Tools
39. Public Improvements—Construction
44. Shop Machinery
45. Power Plant Machinery

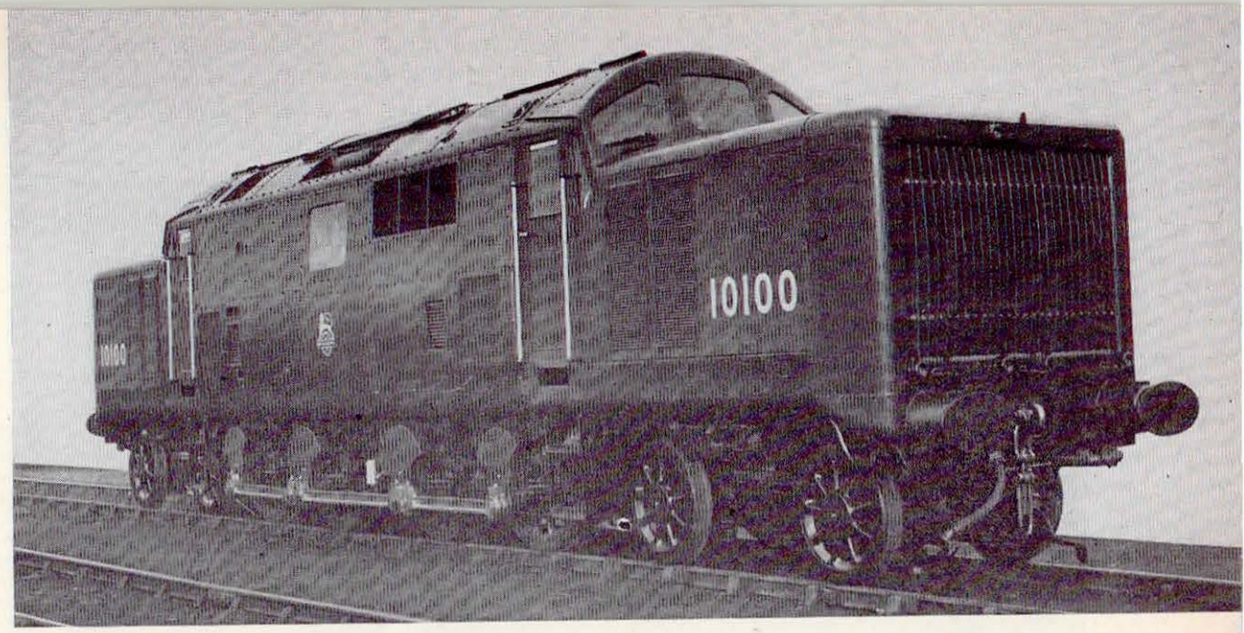
II—EQUIPMENT:

51. Steam Locomotives
52. Other Locomotives
53. Freight-Train Cars
54. Passenger-Train Cars
56. Floating Equipment
57. Work Equipment
58. Miscellaneous Equipment

III—GENERAL EXPENDITURES:

71. Organization Expenses
72. General Officers and Clerks
73. Law
74. Stationery and Printing
75. Taxes
76. Interest During Construction
77. Other Expenditures—General

Acct.	Per Cent	1915	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39	'40	'41	'42	'43	'44	'45	'46	'47	'48	'49	'50
ROAD																																					
1	2.64	101	110	134	159	178	214	175	157	171	171	166	166	164	161	160	152	143	131	127	131	131	133	142	138	137	140	151	175	186	187	197	216	245	271	270	276
2½	0.01	104	107	127	151	172	198	161	154	168	165	161	159	156	155	155	151	143	121	117	127	132	132	141	137	135	134	145	174	185	190	201	236	238	261	258	278
3	15.67	100	110	130	165	190	250	170	143	160	164	149	153	143	135	133	123	118	106	98	100	101	99	103	93	90	90	99	135	142	143	144	148	154	159	139	140
5	1.38	103	109	128	150	183	208	179	165	179	179	179	178	169	155	155	143	130	119	111	122	120	130	139	141	140	149	160	192	223	219	236	260	304	337	339	332
6	8.76	105	111	146	162	178	206	165	160	176	173	171	170	168	164	163	150	134	122	122	136	135	141	155	150	149	156	174	210	227	222	240	272	327	367	374	364
7	0.06	102	124	169	177	184	210	150	153	173	171	168	165	163	163	162	154	144	129	122	136	136	137	158	150	149	159	175	209	236	231	249	284	346	377	382	380
8	5.90	100	100	112	133	170	201	189	157	177	175	172	173	175	176	175	170	155	144	139	149	147	150	159	154	158	164	181	199	228	234	241	252	270	298	302	306
9	8.12	101	106	121	148	152	168	158	144	145	145	144	144	144	144	144	144	144	140	134	123	123	124	143	139	136	138	139	144	144	146	152	165	210	244	245	264
10	4.10	99	129	198	210	203	209	192	161	182	179	177	177	177	177	170	169	165	163	158	150	147	150	169	169	167	167	170	175	173	172	176	190	217	266	278	278
11	4.20	103	107	114	140	150	207	191	176	175	175	174	175	176	176	176	168	159	146	146	141	139	140	143	143	143	143	153	170	175	175	181	194	207	235	254	258
12	3.66	100	100	130	163	175	218	174	165	188	188	188	188	188	188	188	182	175	164	157	159	165	165	169	167	165	165	178	209	241	252	273	298	336	366	366	364
13	0.49	100	120	138	174	193	211	192	179	183	183	180	178	179	179	177	175	168	147	135	140	140	138	145	145	141	141	150	168	179	179	189	206	242	271	279	298
16	3.74	101	115	135	154	185	215	192	180	194	193	188	184	189	188	187	182	165	141	145	151	151	157	166	166	166	177	188	208	219	227	244	291	333	364	368	390
17	0.34	100	115	136	156	185	216	192	178	196	196	189	187	192	191	190	186	166	140	145	150	150	150	162	162	162	177	186	206	226	237	258	307	341	380	386	398
18	0.69	101	120	159	170	191	213	185	178	187	187	186	182	185	186	184	177	161	147	151	155	155	156	166	166	166	172	185	195	208	214	227	249	286	325	327	340
19	0.23	101	120	153	160	190	212	181	166	185	185	182	180	183	183	183	174	159	144	149	154	154	153	159	159	159	163	187	205	216	222	242	270	324	357	357	368
20	2.03	102	118	141	159	188	216	191	180	193	192	188	185	189	188	187	176	161	137	142	147	147	155	165	165	165	176	188	204	216	223	248	294	336	372	379	397
21	0.09	100	110	128	150	185	214	190	184	197	197	193	190	195	193	193	182	165	137	142	147	147	156	164	164	164	166	200	208	213	217	236	281	321	367	367	388
22	0.02	100	115	135	155	185	210	193	178	198	198	193	189	193	191	191	184	165	137	142	147	147	154	166	166	166	176	195	207	218	226	253	300	340	369	377	402
23	0.31	100	114	133	152	178	204	167	158	175	175	174	177	178	178	178	172	158	136	141	146	146	149	153	153	153	161	167	212	226	234	255	291	328	346	350	363
24	0.32	101	117	145	155	184	204	170	159	176	176	174	174	176	176	176	172	157	136	142	147	147	151	153	153	153	160	185	199	211	215	236	278	309	338	341	348
26	0.48	103	124	147	158	164	192	191	162	187	179	163	157	163	165	165	150	138	121	119	124	128	131	135	129	129	134	143	156	165	165	173	192	239	251	250	270
27	1.74	94	106	132	152	165	175	163	158	165	164	162	169	158	155	154	147	138	130	130	133	136	138	143	143	143	146	156	165	176	176	176	199	212	219	226	242
29	0.15	104	122	141	158	189	218	197	184	196	196	191	186	191	191	189	177	162	138	143	148	148	152	167	167	167	176	194	204	213	219	246	296	354	375	386	407
31	0.52	109	145	174	189	190	207	175	164	180	174	175	176	176	179	183	175	149	143	143	147	149	150	154	148	148	153	162	167	171	171	180	201	240	258	266	289
35	0.04	101	117	137	156	186	217	192	179	195	195	190	186	191	190	189	182	164	141	146	151	151	154	161	161	161	168	178	183	198	208	229	290	333	372	378	399
37	0.19	105	113	127	146	158	170	162	149	151	151	151	151	151	149	148	147	144	138	138	147	147	147	161	153	154	158	169	169	187	187	187	222	244	267	270	285
38	0.06	100	100	179	179	184	202	181	170	173	185	190	191	190	191	190	160	155	155	150	150	150	160	170	180	180	180	190	200	200	200	200	245	280	310	315	353
39	1.17	104	108	137	161	182	208	171	164	178	175	171	169	166	165	165	161	153	131	127	139	137	139	152	145	142	146	163	198	208	203	217	236	278	316	321	316
44	0.88	115	126	155	192	200	210	198	173	183	185	185	186	187	189	191	176	166	155	155	179	179	179	198	200	202	212	224	224	228	236	236	271	300	319	324	346
45	0.41	115	126	155	192	200	210	198	173	183	185	185	186	187	189	191	176	166	155	155	168	166	171	180	177	180	189	194	194	190	190	191	217	240	240	242	262
Weighted Average 1–45	68.40	101	110	134	159	178	214	175	157	171	171	166	166	164	161	160	152	143	131	127	131	131	133	142	138	137	140	151	175	186	187	197	216	245	271	270	276
EQUIPMENT																																					
51	4.94	86	102	145	189	202	248	192	179	197	185	171	191	190	179	188	194	184	168	166	176	188	188	201	201	201	215	230	255	265	265	265	290	313	326	326	326
52	4.57	100	117	137	184	184	217	197	196	198	199	192	194	202	203	221	221	210	175	165	185	190	190	198	199	190	190	203	185	173	173	173	185	189	192	190	186
53	11.77	101	148	183	243	267	284	184	156	200	179	171	163	178	169	185	181	161	144	144	165	177	180	191	190	198	204	218	239	254	254	254	300	320	343	360	371
54	2.80	89	104	132	164	197	213	169	152	192	187	183	189	191	180	183	181	178	161	161	173	182	182	195	195	194	200	213	230	240	240	240	285	305	327	343	353
56	0.30	107	125	164	227	245	239	200	175	170	170	170	170	170	170	170	165	158	148	148	158	160	160	171	171	171	171	176	188	207	220	229	238	256	275	280	281	283
57	0.56	96	128	165	225	244	263	193	168	203	183	188	180	192	184	195	191	178	165	165	177	180	180	197	197	200	208	220	247	254	254	254	292	315	338	348	365
58	0.09	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	150	155	165	180	180
Weighted Average 51–58	25.03	96	130	166	219	240	265	185	163	198	182	173	174	183	174	186	185	170	153	153	169	180	181	195	194	198	206	220	242	254	255	255	294	305	323	330	325
GENERAL EXPENDITURES																																					
71–75 & 77	1.03	101	110	134	159	178	214	175	157	171	171	166	166	164	161	160	152	143	131	127	131	131	133	142	138	137	140	151	175	186	187	197	216	245	271	270	276
76	5.54	102	111	135	161	181	216	176	158	172	172	167	167	165	162	161	153	144	132	128	132	132	134	143	139	138	141	152	176	187	188	198	217	246	272	272	279
Weighted Average 71–77	6.57	102	111	135	161	181	216	176	158	172	172	167	167	165	162	161	153	144	132	128	132	132	134	143	139	138	141	152	176	187	188	198	217	246	272	272	279
SUMMARY																																					
1–45	68.40	101	110	134	159	178	214	175	157	171	171	166	166	164	161	160	152	143	131	127	131	131	133	142	138	137	140	151	175	186	187	197	216	245	271	270	276
51–58	25.03	96	130	166	219	240	265	185	163	198	182	173	174	183	174	186	185	170	153	153	169	180	181	195	194	198	206	220	242	254	255	255	294	305	323	330	325
71–77	6.57	102	111	135	161	181	216	176	158	172	172	167	167	165	162	161	153	144	132	128	132	132	134	143	139	138	141	152	176	187	188	198	217	246	272	272	279
Weighted Average 1–77	100	100	115	142	173	193	226	177	159	177	174	168	168	169	164	166	160	149	136	133	140	142	143	153	149	149	153	165	188	200	201	209	232	257	281	282	288



The Fell diesel-mechanical locomotive for main-line service on the British Railways

British Railways Build

2,000-Hp. Diesel-Mechanical Locomotive

Four 500-hp. engines drive through unique mechanical transmission to quills on two of four rod-connected driving axles

By E. C. POULTNEY
M. Inst. Loco. E.

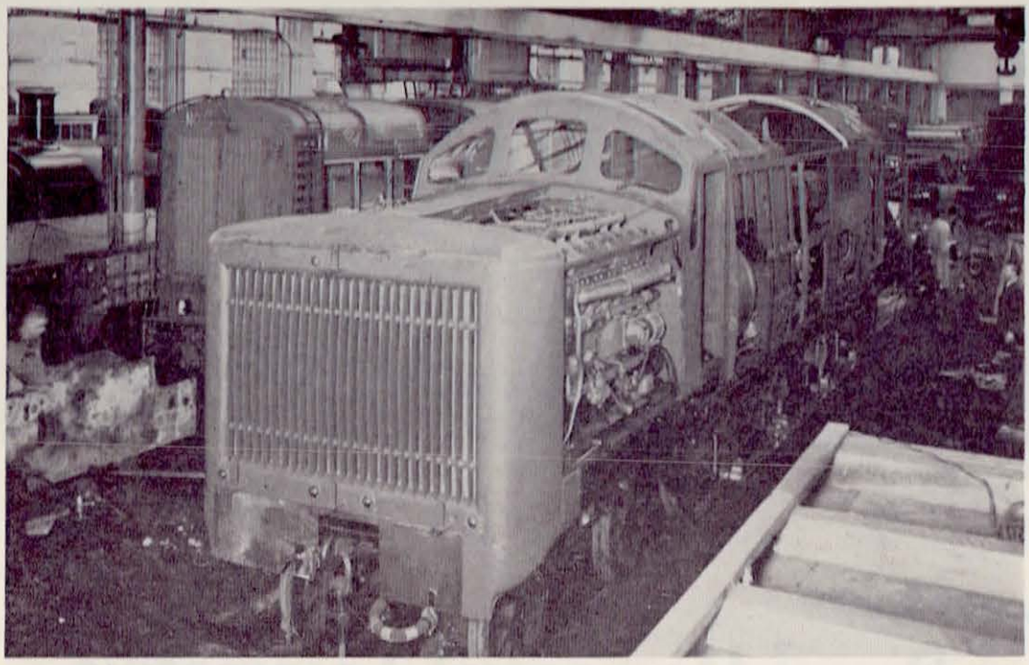
A diesel-mechanical locomotive, intended for main-line service, based on a new principle in diesel power application and transmission, has recently been completed at the Derby works of British Railways. Built on the Fell system of mechanical transmission, the locomotive has been jointly designed by H. G. Ivatt, chief mechanical engineer, London Midland Region, British Railways, and Fell Developments, Ltd. It has eight-coupled driving wheels and a four-wheel truck at each end, being therefore of the 4-8-4 type.

The motive power of the new locomotive consists of four 12-cylinder diesel engines. In order that these main engines should have their full torque available for traction, two auxiliary diesel engines provide power to drive separate supercharging Roots type blowers. The main diesel engines are of the V-type and have cylinders 7-in. bore by 7¾-in. stroke and operate over a speed range of 500 to 1,500 r.p.m.

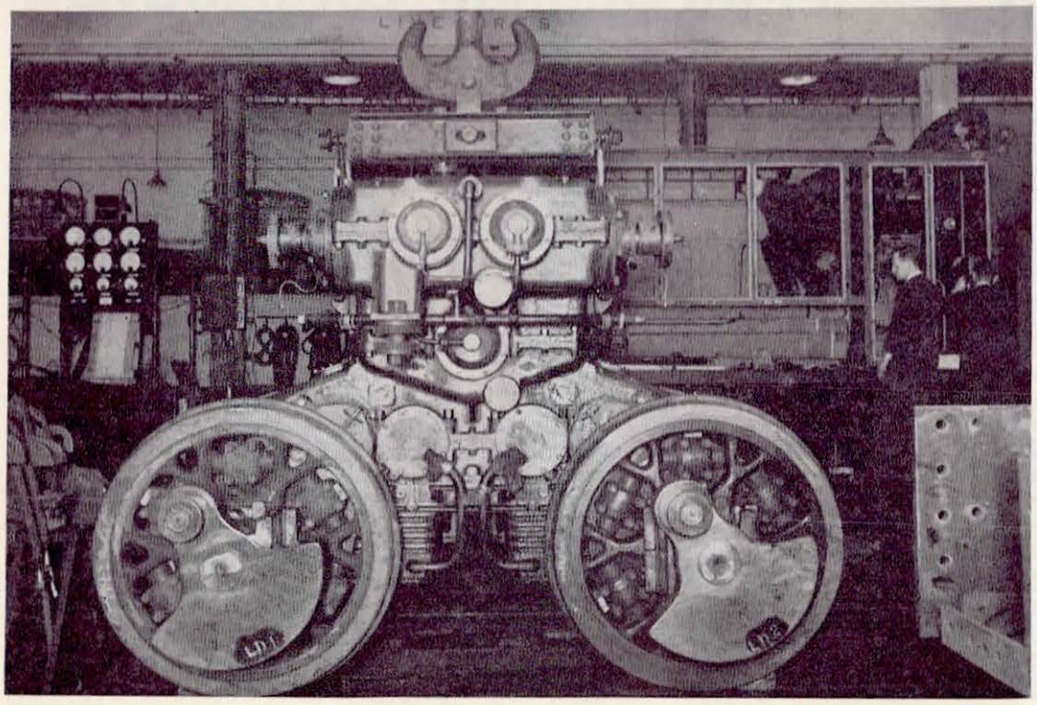
The general arrangement of the motive power equipment embracing the four diesel 500-hp. engines and the mechanical system, interposed between the diesel power units and the driving wheels, constitutes the novel feature of this locomotive. This arrangement is shown diagrammatically. The diesel engines are placed in pairs at each end of the locomotive directly over the four-wheel trucks and drive the transmission gearing housed in a casing in the center of the locomotive, through hydraulic couplings.

The common transmission system involves the use of differential gears as a means of grouping together the output of the four propelling engines. It makes use of three differential gears, so arranged that two, A_1 and A_2, act as primary differentials and a third B, a secondary differential. Each of the four engines E_1, E_2, E_3 and E_4, is connected through its hydraulic coupling H_1, H_2, H_3 and H_4, to one of the four sun wheels of the primary differentials. The planet carriers of the two primary differentials are connected by gears GG, one to each of the sun wheels S_5 and S_6 of the secondary differential and the planet carrier of this last differential delivers the combined power of the four engines to the driving wheels through a train of gears from D, and a final reduction drive. The gears of the reversing train are in constant mesh and by means of a novel arrangement the direction of locomotive running can be changed. The arrangement of the differential gear assemblies outlined allows of progressively changing speed ratios without employing change-speed gears. The gears are always in mesh.

To understand how this arrangement of gearing functions, assume all four engines are running idle and their hydraulic couplings empty. Then, on opening the regulator and at the same time allowing one of the couplings, say H_1, to fill, the associated engine E_1 will commence to drive the sun wheel S_1, to which the output side of that coupling is connected. Each of the primary sun wheels S_1, S_2, S_3, and S_4 has, associated with it, a uni-directional device U, which prevents any backward rotation of that sun wheel. As a result of driving one sun wheel, say S_1, in a forward direction and preventing backwards rotation of the other sun wheel S_2, of the primary differential by means of the uni-directional device U_2, the planet carrier of that differential will drive the sun wheel S_5, of the secondary differential B, through the gears GG, and so connect the driving



Two 500-hp. diesel engines are mounted under the hood at each end of the locomotive. The transmission gear box, train-heating steam generators, and other auxiliaries are in the middle section of the locomotive cab

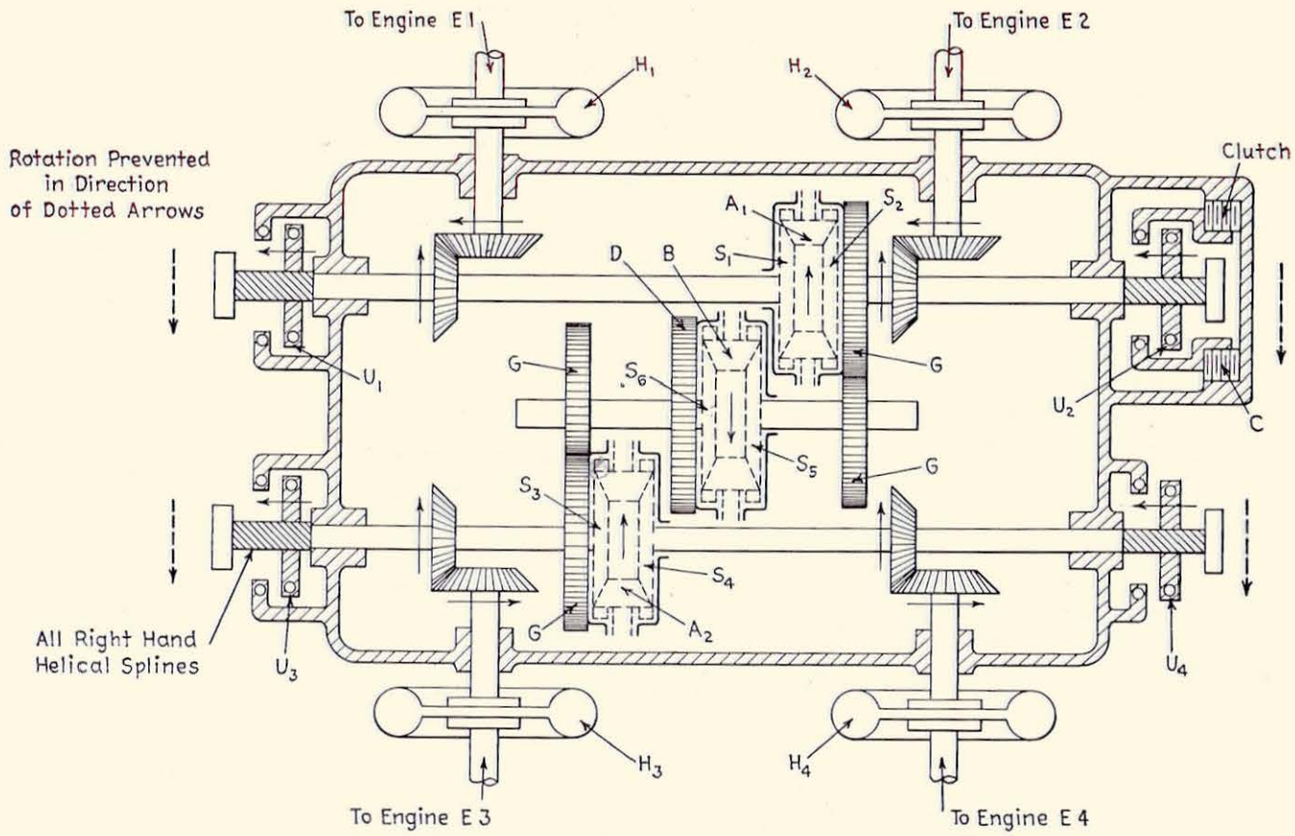


The transmission gear box mounted on the driving wheels showing the quill-shaft rubber driving blocks between the rod wheel spokes

torque from engine E_1 to the driving wheels of the locomotive through the gear D. In this manner engine E_1 is coupled to the final drive and driving wheel with a superimposed gear reduction of four to one; that is, two to one at the primary differential A_1 and again two to one at the secondary differential B.

Upon the locomotive reaching a suitable speed, the coupling H_2 is allowed to fill; it is associated with the second engine E_2, and thus power is transmitted to the sun wheel S_2 and the engine output increased by its governor until the torque developed exceeds the backwards torque on the sun wheel S_2, which is equal to the torque of engine E_1. As soon as this torque equalization takes place, the sun wheel S_2 of the second engine moves in a forward direction and its speed of rotation is added to that of the sun wheel S_1 already running, the result being an increase in speed of the planet carrier A_1 and also the speed of the main driving wheels of the locomotive. Similarly, engines E_3 and E_4 are engaged.

The speed ratios between engines and main drivers, when the connected engines have reached the same speeds of rotation, are four to one for the first engine, two to one for second, one to one and one-third for the third, and one to one for the fourth. The uni-directional devices U prevent any tendency of the shaft to rotate backwards. With this device on each sun wheel shaft,



A diagrammatic plan of the differential transmission gear box of the Fell diesel-mechanical locomotive

any attempt to push the locomotive in a backward direction will result in the devices *U* becoming operative. If, therefore, during any switching operations buffer springs should become compressed when the locomotive backs on to a train, it might be impossible to operate the reversing gear because of the heavy loads on the gear teeth, due to the expansion of the buffer springs. To meet this condition, one of the devices, say U_2, is connected to the gear box structure by a clutch *C*, which may be released to free the transmission.

With this mechanical transmission, changing speed ratios are passed through without shock, the hydraulic couplings being filled in turn under maximum power conditions until all four engines are on load and running at the same speed. After that the desired train speed is obtained by regulating the engine speed. One engine only can develop the maximum tractive force, and bringing the remaining engines under load permits the train speed to be increased.

The speed range of one engine are 0-6 m.p.h.; of two engines, 6-17 m.p.h.; of three engines, 17-24 m.p.h. and of four engines, 24-78 m.p.h.

The lower section of the gearbox contains the final drive train of gears and the reversing mechanism, the latter consisting of a pair of sliding dog clutches, one of which is engaged at a time according to the direction in which it is desired to run the locomotive. A warning light indicates that the sliding dog clutch is fully engaged in whichever direction the locomotive must move.

From the reversing shafts, the final drive is through two hollow quills, running in white metal bearings at each end of the bottom section of the gearbox and integral with it.

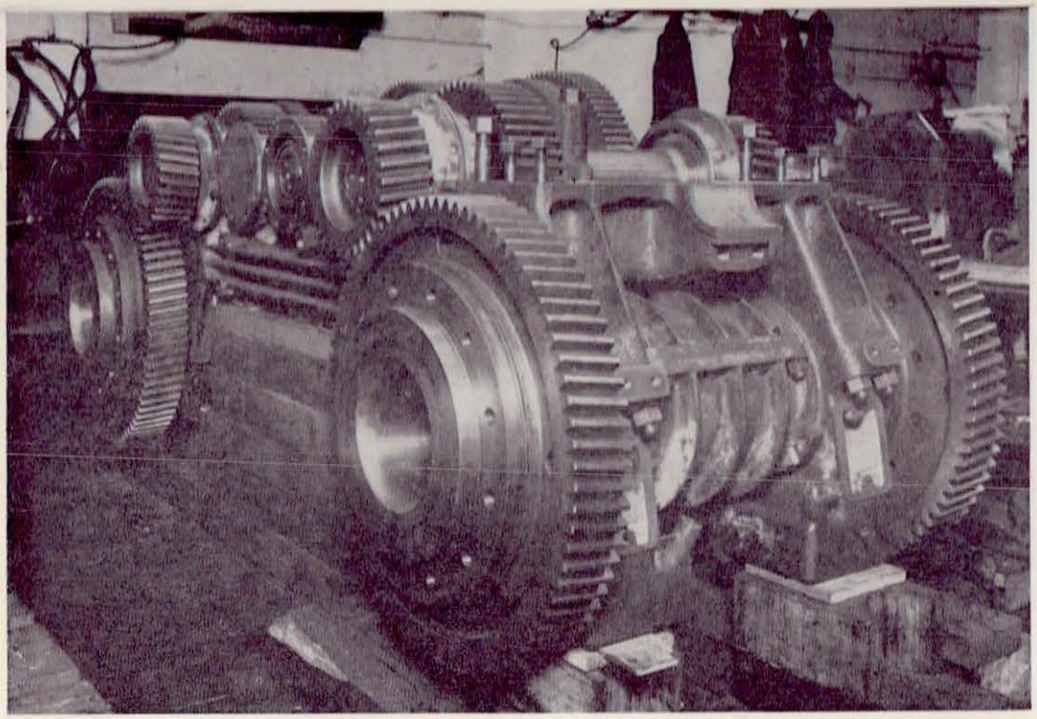
The quills are mounted on the two intermediate driving axles with sufficient clearance above and below the axle to allow for full freedom for rise and fall relative to the frames, and at each end carry arms which transmit the torque to the respective wheel through flexible rubber units between the wheel spokes. Lubrication of the gearbox is by two external oil pumps driven by the auxiliary engines.

The outer and driving wheels are coupled together throughout by coupling rods, with flexible crank pin joints, of the type used on the conventional eight-coupled steam locomotive.

The two six-cylinder diesel engines for the supercharge blower and auxiliary drives are mounted on brackets built up from the main frames and extended over the gearbox. Each blower feeds air through an intercooler to a pair of main engines at one end of the locomotive, and an extension of the blower drives an auxiliary shaft extending to the radiator fans at front and rear ends. The water- and oil-cooling radiators are at the outer ends in each hood, while separate radiators are carried on the body roof for the booster-air intercooling water.

A thermostat control valve is connected to the top header of the water radiators, which by-passes the radiator elements when the circulating water temperature falls, and which insures that the diesel engines will quickly reach the correct working temperature after starting up, by keeping the radiator circuit closed until this temperature is attained. The two radiators are connected together through the auxiliary engines to compensate for the lower efficiency of the rear radiator.

Control of the locomotive is through vacuum diaphragm cylinders operated from reservoirs which are connected to the vacuum brake system. Two exhausters



The final driving-wheel gear and pinion connections. The differential transmission shafts and gears are housed in the upper portion of the gear case

driven by the auxiliary shafts maintain the vacuum in both brake and control gear reservoirs. This control applies to the main diesel governors, reversing gear, fluid coupling scoops, supercharging air control, clutch release, etc.

All controls and the main regulator handle are duplicated in each cab behind the outer engine hoods. The regulator handles are mechanically connected both with each other and with the speed controls on the main engine governors.

In addition to the main regulator, each of four short starting levers operates the governor and fluid coupling scoop vacuum cylinder of one of the engines. With the levers placed in the "stop" position, the diesel engine runs free, the locomotive thus being allowed to overrun the engine. When a lever is moved over to the "start" position, the fluid coupling is filled through the operation of the vacuum cylinder, this action putting the engine applicable to it into positive connection with the gearbox, each starting lever being operated progressively to bring in engines to suit the speed of the locomotive.

The two-position reverse lever marked "Forward" and "Backward" is at the engineman's right hand. It is mechanically interlocked with the regulator so that it can only be altered in position when the latter is shut down. All vacuum controls can be isolated at either end by a master cut-out valve.

A vacuum brake valve is mounted convenient to the engineman's right hand in each cab, and an instrument panel carries locomotive speed and engine r.p.m. indicators, oil-pressure gages, engine-starting switches, etc.

A hand-brake actuating wheel is duplicated in each cab on the right-hand or fireman's side.

The locomotive equipment includes two coach heating boilers, one at each side of the control gearbox. The feedwater is preheated by the main diesel exhausts, the gases passing through tubular heaters located outside the main frames adjacent to the trucks.

A small water scoop replenishes the boiler water tanks at troughs while the locomotive is running.

The main frames are of the conventional plate type well braced by horizontal and vertical plate stretchers. The main engine fuel tanks are designed to form the braces above the truck centers and to carry the truck center pin on the underside. Pumps transfer the oil from the main tanks to service tanks, which supply fuel oil to the engines and the burners for the heating boilers.

Gravity sanding is applied to the front of the outer coupled wheels. For warning purposes there is an air horn with motor compressor.

All driving and coupled axles run on Timken roller bearings with laminated spring suspension. The journal boxes are located between the outside coupling-rod cranks and the wheels. The four-wheel trucks are of standard bolster type with 36-in. wheels and compensated laminated springs in cradles.

The gear ratios have been designed to give the locomotive a maximum speed of 78 m.p.h. when the four main engines are running at maximum speed of 1,500 r.p.m.

Trials will be carried out to test fully this new type of locomotive on work similar to the main-line diesel-electric locomotives already in service, and to determine its capacity for main-line service already worked by comparable steam engines.

PRINCIPAL CHARACTERISTICS OF THE BRITISH RAILWAYS' 2,000-HP. DIESEL-MECHANICAL LOCOMOTIVE

Type of locomotive	4-8-4
Length over buffers, ft.	50
Number and type of main diesel engines	4—Davey Paxman
Continuous rating, supercharged, hp.:	
Per engine	500
Total	2,000
Cylinders:	
Number per engine	12
Bore and stroke, in.	7 x 7¾
Main engine speed, r.p.m. (max.)	1,500
Auxiliary supercharge engines, number and type	2—6-cyl.
Driving-wheel diameter, in.	51
Total weight in working order, lb. (est.)	268,800
Engine fuel capacity, main tanks, Imp. gal.	720
Coach-heating fuel and service tank, Imp. gal.	150
Coach-heating water tanks, Imp. gal.	500
Header water tanks, Imp. gal.	60
Maximum locomotive speed, m.p.h.	78
Maximum tractive force, lb.	25,000
Adhesion factor	5.65

GENERAL NEWS

Net Income for 1951

(Continued from page 37)

had a net railway operating income of $170,835,163, compared with $167,671,452 in the same period of 1950.

Gross in the Western district in the first seven months of 1951 totaled $2,401,872,027, an increase of 18 per cent compared with the same period of 1950, while operating expenses totaled $1,882,969,648, an increase of 18.8 per cent.

The Kaw River Rages Again

The Kaw River is on the rampage again. Swollen by continuous rains in western and central Kansas, it has already done considerable damage to rail facilities at Topeka, while its tributaries have washed over the rails of several secondary lines in that area. Because there are a number of breaks in dikes not fully repaired since the July flood, considerable damage may be wrought even with a crest substantially lower than that experienced earlier last summer.

Sixteen panels of a temporary trestle at Topeka have already been destroyed. The trestle was being constructed by Rock Island forces to replace a steel structure totally destroyed last July. Army engineers had informed railroad officers that the waters could be expected to crest at about 27 feet at Topeka, but when, on September 5, the waters had reached 31 feet and there was no immediate indication of cresting, both the Rock Island and the Santa Fe ordered all equipment removed from their low-lying Armourdale and Argentine yards at Kansas City. During the July floods, both roads had maintained operations in their yards almost up to the time the dikes gave way on assurances from those in authority that the dikes would hold. Now, with the dikes still damaged, neither road is risking the possibility of a second fiasco. Similarly, the Union Pacific has evacuated its Armstrong yard in Kansas City, although some operations were being maintained in the Fairfax district.

Here is a summary of reports telephoned to *Railway Age* on September 5 by the affected roads:

Santa Fe—The following statement was released to the daily press at noon, September 5: "Because of continued rain in eastern Kansas during the past 24 hours and because of the stage of the Kaw River at Topeka which showed a reading of 24.6 feet at 10 A.M. with further high water in prospect, and as a result of damage to dikes on the Argentine side of the Kaw River caused by the July 13 flood which has not been repaired, instructions were issued this forenoon to move all rolling stock out of our Argentine yard. This includes all freight equipment and diesel and steam locomotives. At the same time instructions were issued to our people to hold up freight trains from the east and west, and all connecting lines were advised to hold up on making deliveries to us because of threatened flood conditions in and around Argentine. Under present plans we contemplate that passenger trains and some freight trains will move through Argentine on main tracks without entering the yard. This practice will continue unless prevented by further rise of the water." As of September 6, the line between Ottawa and Topeka was out of service and it was expected that the Topeka-Lawrence line would also be out within 24 hours.

[*A few minutes before press time the Santa Fe informed us that all operations through Kansas City would be maintained because dike work by Army engineers and by contractors hired by the railroad had progressed to the point where the crest of the flood could be controlled.*]

Rock Island—Orders have been issued to clear Armourdale yard of all rolling stock and motive power and to remove all rolling stock from nearby industrial sidings whether unloaded or not. All cars and motive power will be taken to passing sidings and other locations out of reach of the waters and stored until the danger is passed. Sixteen panels of a temporary trestle being erected at Topeka to replace a steel structure totally destroyed last July have been wrecked by the swift-flowing Kaw. For the time being all freight is being detoured via MacFarland and Belleville to Colorado Springs, Colo., and Denver, thence via Santa Fe. The "Golden State" and the "Imperial" are also detouring enroute to Pacific Coast.

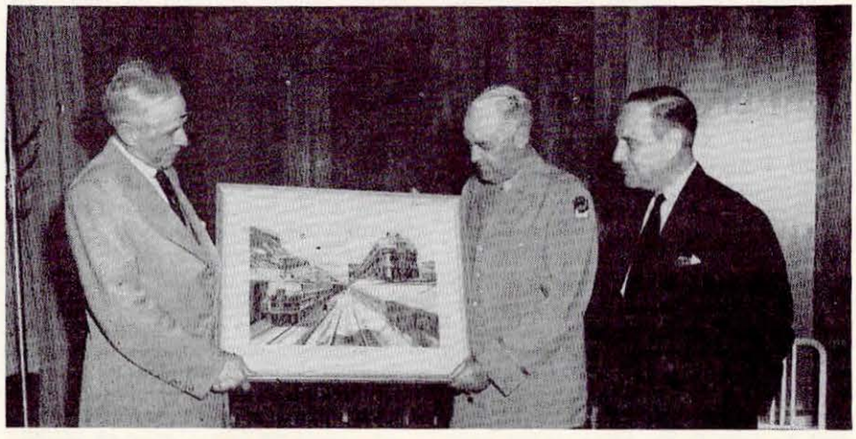
Union Pacific—As the dikes protecting Armstrong yard at Kansas City are good only up to a 27-ft. level and Army engineers have now revised their estimate to a 31-ft. crest sometime during the day of September 6, all equipment has been removed to higher ground. Army engineers are throwing a new dike against Jersey creek in Fairfax (Kansas City) district and it is hoped that the waters will be kept back. Some equipment here has been withdrawn. At Topeka, waters are threatening but there has been no direct damage and the waters will have to rise between 2½ and 3 feet before topping yard tracks. Everything has been removed from the yards as a precautionary measure. Passenger trains operating normally but will begin detour at Manhattan if conditions at Kansas City get worse. Waters have have been reported receding at Manhattan after being over the rails at some points. A drop of one inch has been reported at Topeka.

Missouri Pacific—There is some high water which is threatening operations at Ottawa, but all lines are open to service.

Missouri-Kansas-Texas — Patrols watching lines at several points but there have been no interruptions of traffic.

Two Emergency Boards Appointed

Emergency boards to investigate disputes involving the Pullman Company and the Denver & Rio Grande Western have been appointed by President Truman. The Pullman case is one in which the conductors are seeking a $90-per-month wage increase. These employees are represented by the Order of Railway Conductors. On the D. & R. G. W. the dispute is over a



AN ORIGINAL PAINTING of new Baltimore & Ohio diesel-electric locomotives was presented to Colonel R. B. White, B. & O. president, by Sam Littlejohn, manager of the General Electric Company's Apparatus department's Atlantic district at a luncheon in Baltimore recently. W. S. Morris, vice-president of the American Locomotive Company in charge of Alco-G.E. divisions, looks on. The painting, by the railroad artist, Howard Fogg, depicts the latest Alco-G.E. 1,600-hp. dual-purpose locomotives in both freight and passenger service on the B. & O. A full-color reproduction of the painting has been used in recent Alco-G.E. advertisements (*Railway Age*, April 2, pages 12 and 13)

new working agreement and involves the Brotherhood of Locomotive Engineers.

Members of the emergency board in the Pullman case include Carroll R. Daugherty, Northwestern University professor, as chairman; George Cheney, labor relations consultant, San Diego, Cal.; and Andrew Jackson, New York City attorney.

In the D. & R. G. W. case, the board members are Frank P. Douglass, chairman; Frank M. Swacker, New York City attorney; and Judge Robert G. Simmons, chief justice of the Nebraska Supreme Court.

Roads Must File Special Report on Station Costs

Class I railroads, excluding switching and terminal companies, have been called upon by the Interstate Commerce Commission to file a special report on "Railroad freight station costs and other performance factors." The reports will be due December 15.

The commission called for it and prescribed the form in an August 28 order. The order noted that the commission's plan to issue it had been announced in a July 31 notice which gave interested parties until August 24 to state their views.

Another Rate Complaint Filed by Government

The Department of Justice has filed with the Interstate Commerce Commission a complaint assailing railroad charges on government shipments of cement from Irving, Wash, and Metaline Falls to Coram, Mont. The cement is being used in the construction of Hungry Horse Dam, which is "a defense project of highest priority," according to the Justice Department's press release on the complaint.

The complaint seeks rate cuts of six to eight cents per 100 lb., with an award of reparations. It contends that the present rates, which apply to both bulk and sacked cement in connection with a carload minimum weight of 50,000 lb., are unreasonable for the government's bulk shipments, which have "exceeded 150,000 lb. per carload." It is suggested that the commission prescribe a minimum weight of 140,000 lb. along with the lower rate basis proposed.

The railroads have refused to adjust the rates in response to requests made by the Department of Interior, the Justice Department's release said. It also reported that Attorney General McGrath had made this comment:

"The present rates on cement were established at a time when most cement was sacked and shipped in box cars. Now, cement, including the government's cement, is shipped also in bulk and in covered hopper cars. When these matters are considered, it is apparent that lower rates on these cement movments are justified."

Pullman-Standard Strike Settled

Settlement of the strike which has tied up car building plants of the Pullman-Standard Car Manufacturing Company since early July, was announced in Washington, D. C., on September 6 by Cyrus S. Ching, director of the Federal Mediation and Conciliation Service. No details of the settlement were immediately available, but it was anticipated that the strikers would be back to work by September 10.

The agreement was reached in around-the-clock sessions at which the Mediation Service was represented by a three-man panel headed by Louis Lopez. The mediation sessions had been transferred from Chicago to Washington on September 4.

Pullman-Standard plants involved were those at Butler, Pa., Bessemer, Ala., and Hammond, Ind. The striking employees were represented by the United Steelworkers of America, C.I.O.

Walther Retires From N.R.A.B.

Andrew G. Walther, carrier member of the National Railroad Adjustment Board at Chicago, has retired. He has been succeeded by David H. Hicks, assistant manager of labor relations of the Baltimore & Ohio, at Baltimore, Md.

New P. & D. Service On Jersey Central Lines

With the opening of the Jersey Central Lines' new $1,000,000 freight transfer station at Elizabethport, N. J., on September 1 a new system was put into effect for handling less-than-carload shipments formerly handled at various local freight stations.

Under the new system, all l.c.l shipments once handled at Elizabeth, Grasselli, Carteret, Newark, Roselle, Cranford, Garwood and Westfield are handled at the new transfer station, with

HOW NEW YORK STATE'S NEW TRUCK TAX LAW WILL BE APPLIED

Applications for permits to operate trucks in New York under terms of that state's new weight-distance tax law which goes into effect next October 1, were to be filed by September 10 (*Railway Age*, March 19, page 68, and March 26, page 52). Each motor vehicle weighing over 18,000 lb. gross, with certain specified exemptions, must obtain a plate and permit before operating on New York public highways. A fee of $5 is charged for each permit, which must be carried in the motor vehicle for which it was issued. The accompanying plate must be affixed upon the vehicle as close as practical to registration or license plates.

Permits, which cannot be transferred or assigned, are valid until revoked and need not be renewed annually. A permit for emergency operation is obtainable within 24 hours and is good for 15 days. Permits may be revoked or suspended for violating any provision of the tax law or any rule or regulation promulgated by the State Tax Commission in connection with the law, for failing to pay the required tax, for operating a vehicle the gross weight of which exceeds the maximum specified in the permit, and for failure to keep operating records. Operating records should include the date, origin and destination of each trip, vehicle numbers, number of round trips each day, and of miles traveled laden and empty. Records must be kept in the state, unless permission is granted to keep them elsewhere. The tax must be filed on or before the twentieth day of each month for the preceding calendar month, with first return due no later than November 20, 1951.

Suspension or revocation of a permit results automatically in suspension or revocation of all permits issued to the carrier. If the permit of a New York state registered vehicle is revoked or suspended, the Bureau of Motor Vehicles will not re-register or transfer the registration until there is full compliance with the law. Operating a vehicle without a permit will be punishable on a first conviction by a fine of $100 to $250; on a second or subsequent conviction by a fine of $250 to $500 or imprisonment for not over 10 days.

For non-payment of the tax a penalty of 5 per cent of the amount due, plus one per cent interest for each month of delay, will be charged, all New York state registration plates of the owner will be revoked and all permits of the carrier may be suspended or revoked. Penalty for filing a false return, or failure to file a return, will be a fine of 100 per cent of the amount due, plus one per cent interest for each month of delay. Any person wilfully filing a false return, or purposely failing to file a return, is guilty of a felony.

Tax rates applicable under the law, and exemptions, were given in the March 19 *Railway Age*.

It was originally planned to set up 42 weighing stations to assist in enforcement of the new law, with 71 others to be established in the future. Present reports indicate, however, that only about 20 of the first 42 stations will be ready by October 1. Lack of funds is given as the reason. No information is presently available as to when the other 22 stations in the first group, or the 71 in the second group, will be established.

direct trucking between Elizabethport and businesses and industries in those areas. Formerly such shipments were moved between Elizabethport and the local stations in local freight trains, which entailed several handlings of freight.

Although the new station was opened September 1, some construction will not be completed for another month or six weeks.

D. Y. Smith, chief freight traffic officer, said it is expected shipping time will be cut at least in half through use of the new facilities and system. "Under the new system," he added, "a business or industry may perform its own trucking to and from Elizabethport. . . The charge for using our trucking service will be only 15 cents per 100 lb."

Barge Builders Want More Steel Plates and Shapes

Larger allocations of steel plates and structural shapes "must be made next year to barge builders to permit expansion of inland waterway transportation facilities," the National Production Authority has been informed by the industry advisory committee, which represents builders and repairers of inland waterway vessels. This was revealed in an N.P.A. press release, issued to report on the committee's first meeting with N.P.A. officials.

The N.P.A. officials "said that the requested increase in steel allotments for barges in 1952 will be studied by the Defense Production Administration's requirements committee," according to the release It also reported that representatives of the Defense Transportation Administration had "supported the industry's plea for increased steel quotas."

"A D.T.A. survey," it added, "indicated a bedrock demand for 110 to 120 new units (towboats and barges) quarterly just to meet the most essential needs, or about half the potential demand reported by the builders."

A production schedule on the 110-120 basis would require 50,000 to 60,000 tons of steel quarterly, the N.P.A. statement also said. Meanwhile, it noted that fourth-quarter allocations to the industry total only 33,000 tons—"slightly above 40 per cent of third-quarter allotment."

O.P.S. Opposes New Rates On Pick-Up and Delivery

The Office of Price Stabilization has asked the Interstate Commerce Commission to suspend the tariff filed recently by Eastern railroads, proposing increases on pick-up and delivery charges. The increases, scheduled to become effective September 10, would apply on freight moving on l.c.l. or any-quantity rates within Eastern territory.

O.P.S. said this increase in charges would be "arbitrary, unreasonable, and discriminatory." It urged the commission to suspend the tariff and hold public hearings. The higher charges proposed by the railroads would apply on intraterritorial traffic moving 300 miles or less and on all interterritorial traffic.

Permitting Eastern carriers to collect these additional charges would cause railroads in other territories to seek similar relief, and the net result would be a widespread increase in cost of freight transportation, O.P.S. said.

I.C.C. Issues Four More Reports in Signal Case

Supplemental reports granting relief sought by the Seaboard Air Line, while denying that sought by the St. Louis-San Francisco, the St. Louis Southwestern and the Missouri Pacific, have been issued by the Interstate Commerce Commission in the general signaling case. The case is the No. 29543 proceeding out of which came the order of June 17, 1947.

That order requires the installation of an automatic block signal system on lines over which any passenger train is operated at 60 or more m.p.h. or any freight train is operated at 50 or more m.p.h.; and installation of an automatic train-control or cab-signal system on lines over which any train is operated at 80 or more m.p.h.

The relief granted to the S.A.L. postponed, until further order of the commission, the application to that road of the June 17, 1947, order's requirement with respect to the installation of train-control and cab-signal devices on freight locomotives. Like relief had previously been granted to other roads, this report noted.

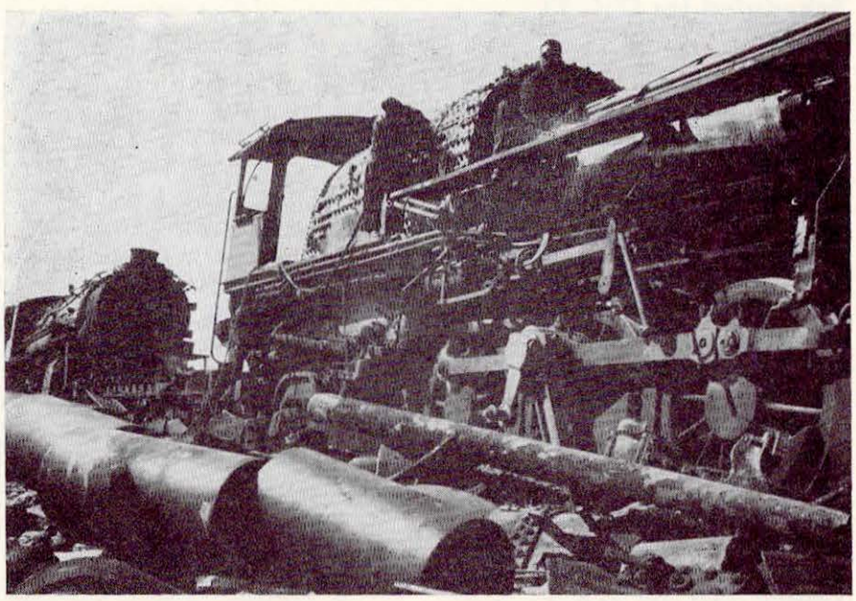
The Frisco report denied that road's petition for relief with respect to the operation of passenger ad freight trains over 297.5 mi. of single-track lines—between Edward, Kan., and Afton, Okla., 84 mi., between Marquette, Mo., and Chaffee, 9 mi., between Chaffee and Turrell, Ark., 139.5 mi., and between Sherman, Tex., and Irving, 65 mi.

The Cotton Belt report denied that road's petition for relief with respect to the operation of passenger and freight trains over its 225.6-mi. line between Dexter, Mo., and Pine Bluff Shops, Ark. The M. P. report denied a petition filed by that road and its affiliate, the St. Louis, Brownsville & Mexico, for relief with respect to the operation of "low center of gravity, diesel-powered, light-weight" passenger trains between Poplar Bluffs, Mo., and Texarkana, Arfl., 324. 7 mi., and between Hoisington, Kan., and Pueblo, Colo., 337 mi.; of "conventional type" passenger trains and freight trains between Nevada, Mo., and Carthage, 46.7 mi.; and all three types of trains between Vanderbilt, Tex., and Brownsville, 240.1 mi.

Freight Car Loadings

Car loadings for the week ended September 1 were not available when this issue of *Railway Age* went to press.

Loadings of revenue freight for the



SYMBOLIC BOTH of the nation's need for scrap steel and of the declining importance of steam locomotives on many of the nation's railroads is this picture of a retired locomotive being dismembered at the Worcester, Mass., plant of the American Steel & Wire Co., a United States Steel Corporation subsidiary. It takes three men a week to break down the old locomotive and to segregate copper, brass and bronze parts from heavy melting steel scrap—of which this locomotive, plus 12 others, will yield about 2,000 tons

week ended August 25 totaled 838,587 cars; the summary for that week, as compiled by the Car Service Division of the Association of American Railroads, follows:

REVENUE FREIGHT CAR LOADINGS
For the week ended Saturday, August 25

District	1951	1950	1949
Eastern	140,869	141,144	132,804
Allegheny	172,071	172,955	141,293
Pocahontas	66,151	63,948	48,524
Southern	127,233	129,697	110,104
Northwestern	143,291	136,338	134,256
Central Western	124,706	131,296	118,915
Southwestern	64,266	63,287	61,315
Total Western Districts	332,263	330,921	314,486
Total All Roads	838,587	838,665	747,211
Commodities:			
Grain and grain products	53,862	51,556	50,651
Livestock	9,609	8,260	11,454
Coal	155,359	154,103	120,720
Coke	16,614	13,733	10,029
Forest products	46,079	50,203	41,072
Ore	90,126	79,226	64,509
Merchandise l.c.l.	75,041	89,070	92,580
Miscellaneous	391,897	392,514	356,196
August 25	838,587	838,665	747,211
August 18	829,398	851,240	731,215
August 11	809,354	847,708	728,029
August 4	813,366	837,430	716,863
July 28	819,875	845,011	724,044
Cumulative total 34 weeks	26,200,254	24,278,196	24,422,464

In Canada.—Car loadings for the week ended August 25 totaled 82,584 cars, compared with 82,983 cars for the previous week and 78,921 cars for the corresponding week last year, according to the Dominion Bureau of Statistics.

	Revenue Cars Loaded	Total Cars Rec'd From Connections
Totals for Canada:		
August 25, 1951	82,584	33,430
August 26, 1950	78,921	16,341
Cumulative totals for Canada:		
August 25, 1951	2,693,972	1,183,399
August 26, 1950	2,441,459	1,042,550

Ogden Gateway Argument Scheduled for Oct. 11

The Interstate Commerce Commission will hear oral argument October 11 in the so-called Ogden Gateway case. The proceeding, docketed as No. 30297, is based on a complaint by the Denver & Rio Grande Western, asking the I.C.C. to require the Union Pacific to participate in joint through rates via the Ogden gateway on traffic between Colorado common points and points east thereof, and points in Utah, Idaho, Montana, Oregon, and Washington.

The commissioner's chief examiner, Frank E. Mullen, in a proposed report last November, recommended that the commission force open the gateway. Adoption of his recommendation would have the effect of short-hauling the U. P. (*Railway Age*, November 25, 1950, Page 50.)

South Buffalo Strike Called Off by B.R.T.

The Brotherhood of Railroad Trainmen has called off the strike of about 300 brakemen and conductors on the South Buffalo, which halted the road's operations and forced a virtual shutdown of the Bethlehem Steel Company's Lackawanna, N. Y., plant (*Railway Age*, August 27, page 33).

C. F. Dullenkopf, vice-president of the road, said the union agreed to submit to arbitration by two boards "all disputed claims, except two claims for lost or damaged clothing which the railway agreed to pay without admitting liability, four claims on account of yardmasters throwing switches, six claims on account of yardmasters giving signals, and four claims that the company had previously agreed to pay. The company also allowed, without precedent, three claims on account of violation of the assignment rule and the brotherhood withdrew, without precedent, five claims on account of violation of that rule, and one other claim."

I. C. C. Takes I. C. C. To Court over I. C.

Confusing as that may sound, it's true!

The Illinois Commerce Commission has filed suit in federal district court against the Interstate Commerce Commission, which recently granted the Illinois Central an increase in intrastate suburban fares. In its suit, the Illinois body seeks to have the federal commission set aside the fare increase on the grounds that interstate commerce is not involved and the federal body therefore has no jurisdiction.

The jurisdictional mixup began last February when the Illinois Central, failing to obtain permission to increase certain suburban fares from the state commission, took the matter to the federal commission on the grounds that interstate commerce was being adversely affected by losses incurred by the Chicago suburban service. The federal commission subsequently approved fare increases which would have increased suburban revenues by an estimated $1.3 million per year. These increases were to have been placed in effect on August 25, but the Illinois Central has agreed to withhold them until September 15.

The September 15 date was set by counsel for the road after Federal Judge William J. Campbell continued until September 12 the state commission's suit against the I.C.C. It is expected that, by September 12, Chief Justice J. Earl Major of the U. S. Circuit Court of Appeals will have appointed a three-judge court to hear the case. If not, it will be temporarily handled by Judge Philip L. Sullivan.

Mississippi Express Rates

The Interstate Commerce Commission has found that undue discrimination against interstate commerce has resulted from the Mississippi Public Service Commission's failure to approve increases in intrastate express rates in line with those aproved by the I.C.C. for interstate application. The commission withheld entry of an order but its report stated that one would be issued unless the Mississippi commission advised that the required intrastate adjustment would be approved. The case was docketed as No. 30760.

ORGANIZATIONS

Coordinated Mechanical Associations Programs

Six groups to meet at Chicago September 17-19

Beginning Monday, September 17, the Coordinated Mechanical Associations, and the Electric Sections of the Association of American Railroads' Mechanical and Engineering Divisions, will hold a three-day meeting in Chicago. The mechanical associations are the Air Brake, Master Boiler Makers', Car Department Officers', Fuel and Traveling Engineers and Locomotive Maintenance Officers. The meetings of these five groups will be held at the Hotel Sherman and the meetings of the Electrical Sections, with the exception of a joint session with the L.M.O.A., will be held at the Hotel La Salle. There will be an exhibit of mechanical products at the Hotel Sherman under the auspices of the Allied Railway Supply Association, Inc. All the mechanical associations have arranged their programs so the afternoon of September 18 will be free for members to inspect exhibits.

Officers of the coordinating committee of the Coordinated Mechanical Associations, conisting of the presidents and secretaries of the railway associations and the exhibiting organization, are: Chairman, A. K. Galloway, general superintendent motive power and equipment, Baltimore & Ohio; vice-chairman, J. P. Morris, general manager, mechanical department, Atchison, Topeka & Santa Fe; vice-chairman, George Bohannon, chief mechanical officer, Chicago & North Western; secretary, C. F. Weil, American Brake Shoe Company. B. S. Johnson of W. H. Miner, Inc., is president of the Allied Railway Supply Association and C. F. Weil is secretary-treasurer of the supply association which, this year, is in charge of the exhibit.

The programs of the several associations appear below, with Central Daylight Saving Time given throughout.

Air Brake Association

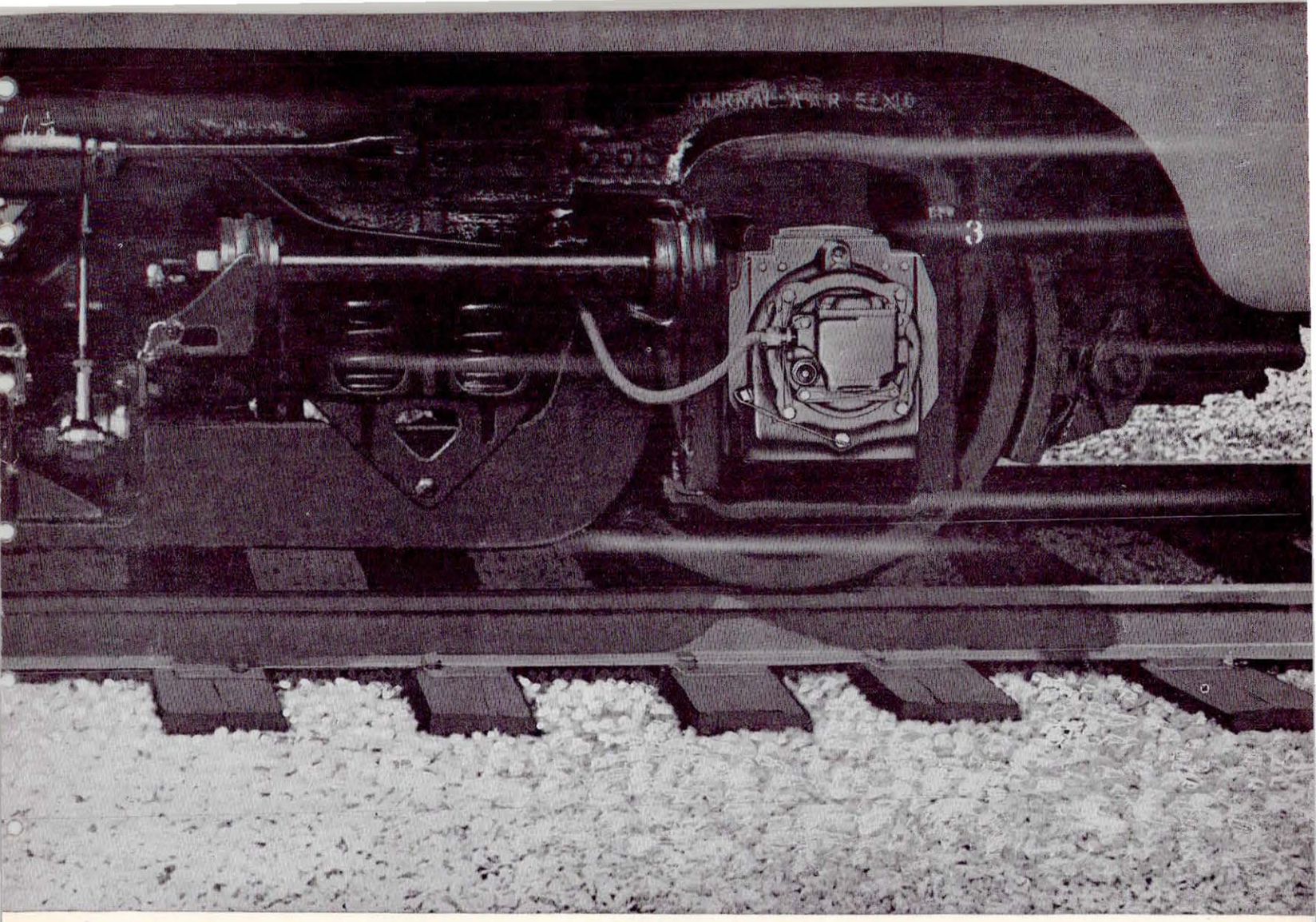
MONDAY, SEPTEMBER 17

10 a.m.

President's address
Secretary's report
Miscellaneous
Inspection and Testing of 24-RL Equipment—Central Air Brake Club, John Mattise (chairman), C. & N. W.

2 p.m.

To Obtain a Higher Efficiency in Air Brake Service, S. L. Williams, Westinghouse Air Brake Company



Keeping Wheels Turning Cuts RE-Turning!

Turning wheels are *earning* wheels. When they're rolling on the track, they're playing their part in paying a return on the money invested in the equipment. When they're being RE-turned it's a costly maintenance operation.

There's a practical way to keep wheels *off* the lathes and *on* the tracks . . . with the Westinghouse AP Mechanical-Pneumatic Decelostat. At the first hint of a slip, the Decelostat momentarily relieves braking pressure . . . permitting wheels to regain train speed . . . then, braking pressure is immediately built up to train level.

Because braking pressure is relieved the instant wheel slip *starts* . . . the slip is arrested *before it can* develop into a *slide*. Why not send for Bulletin DL 2461-1 today? It will provide you with complete information.

Brakes are Basic to Railroad Progress

Westinghouse
AP mechanical pneumatic
DECELOSTAT®

Westinghouse Air Brake Co.
AIR BRAKE DIVISION
WILMERDING, PA.

Freight and Passenger Train Handling and Dynamic Braking, F. T. McClure (chairman), A. T. & S. F. (In joint meeting with Railway Fuel & Traveling Engineers' Association)

TUESDAY, SEPTEMBER 18

9 a.m.

Effects of Air Leakage in Freight Trains, by H. N. Sudduth, New York Air Brake Company

Clasp Brake Maintenance, H. I. Tramblie (chairman), Chicago, Burlington & Quincy

Report of Approved Maintenance Practice Committee, F. W. Dell (chairman), Grand Trunk Western

WEDNESDAY, SEPTEMBER 19

9 a.m.

24-RL Brake Equipment—St. Louis Air Brake Club, E. W. Erisman (chairman), Wabash

No. 6 Type of Brake Equipment for Diesel-Electric Switching Locomotives, Manhattan Air Brake Club, L. D. Hays (chairman), New York Central

Removal of Moisture from Yard Charging Plant Air, Pittsburgh Air Brake Club

2 p.m.

Unfinished business—Committee Reports

Election of officers

Presentation of Past President's badge

Car Department Officers' Association

MONDAY, SEPTEMBER 17

10 a.m.

Address by President J. A. Deppe, superintendent car department, Chicago, Milwaukee, St. Paul & Pacific

Address by J. P. Kiley, president, C. M. St. P. & P.

Report on Wheel Shop Practices, by E. E. Packard, district master car repairer, Southern Pacific

2 p.m.

Report on A.A.R. Loading Rules, A. C. Bender (chairman), joint supervisor car inspection, Cleveland Car Inspection Association

Report on Interchange and Billing for Car Repairs, J. J. Sheehan (chairman), supervisor car repair bills, Missouri Pacific

Report on Air-Conditioning Equipment—Operation and Maintenance, R. F. Dougherty (chairman), general electrical & air conditioning inspector, Union Pacific

TUESDAY, SEPTEMBER 18

9 a.m.

Report on Analysis of Train Yard Operations—Inspection and Maintenance of Air Brakes, W. B. Medill (chairman), master car repairer, S. P.

Address by G. J. Willingham, director of personnel, Illinois Central

Report on Car Lubrication, K. H. Carpenter (chairman), superintendent car department, Delaware, Lackawanna & Western

WEDNESDAY, SEPTEMBER 19

9 a.m.

Report on Inspection, Conditioning and Repairing Cars for Higher Commodity Classification, T. E. Hart (chairman), chief car inspector, New York, Chicago & St. Louis

Report on Cleaning and Painting Materials for Refinishing Passenger Equipment, E. M. Driscoll (chairman), foreman painter, C. M. St. P. & P.

Election of officers

Master Boiler Makers' Association

MONDAY, SEPTEMBER 17

9:15 a.m.

Message, Association President R. B. Barrett

Message, D. V. Gonder, assistant to vice-president, Canadian National

Topic No. 2—Procedure for fabrication of all-welded locomotive, stationary and portable boilers. Advantages of all-welded boilers vs. riveted boilers as experienced to date, George M. Davies (chairman), assistant engineer, locomotive equipment, N. Y. C.

Message, Secretary-Treasurer, A. F. Stiglmeier

2 p.m.

Report of the Executive Board

Topic No. 1—Fabrication and erection of modern stationary boilers, with moving pictures. Advantages of chemically descaling stationary and portable boilers, with moving pictures. Stanley F. Wentz (chairman), assistant supervisor of boilers, N. Y. C.

TUESDAY, SEPTEMBER 18

9 a.m.

Message, J. P. Wadsworth, superintendent of safety, C. N.

Topic No. 3—With use of approved chemicals in locomotive feedwater for purpose of reducing blowdown and carrying higher solids in boiler water. What, if any, adverse and detrimental effects are experienced from these increased solids? F. E. Godwin, (chairman), mechanical inspector, C. N.

Election of officers

Report Committee on Law

WEDNESDAY, SEPTEMBER 19

9:15 a.m.

Report Committee on Memorial

Message, Edward H. Davidson, director, Bureau of Locomotive Inspection, Interstate Commerce Commission

Topic No. 4—Proper procedure to be followed in maintenance and testing of stationary and portable air reservoirs other than locomotives and cars. Care and maintenance of stationary and portable boilers. Harry C. Haviland (chairman), supervisor of boilers, N. Y. C.

Topic No. 5—What effect do pounds, broken frames and stuck or gauled expansion shoes have on boiler maintenance? A. A. Edlund (chairman), assistant general boiler inspector, C. M. St. P. & P.

2 p.m.

Report Committee on Resolutions

Topic No. 6—Procedure for washing and testing steam generators on locomotives other than steam. What improvements can be made to abate corrosion on steam generator coils? What improvement can be made to abate electrolytic action and corrosion on heating boilers on electric locomotives? S. H. Christopherson (chairman), supervisor of boiler and welding inspection, New York, New Haven & Hartford

Locomotive Maintenance Officers' Association

MONDAY, SEPTEMBER 17

10 a.m.

Address by President P. H. Verd, superintendent motive power and equipment, Elgin, Joliet & Eastern

Address by K. F. Mitchell, manager of equipment, N. Y. C. system

2 p.m.

Report of Committee on Winterization of Diesel-Electric Locomotives, F. Thomas (chairman), assistant to general superintendent equipment—diesel-electric, N. Y. C.

Report of Committee on Personnel Training, E. V. Myers (chairman), superintendent, St. Louis Southwestern

Report of Committee, Diesel Mechanical, L. I. Luthey (chairman), general supervisor of diesel engines, A. T. & S. F.

1. Air filters
2. Extension of inspection periods
3. Water and oil leaks

TUESDAY, SEPTEMBER 18

10 a.m.

Report of Committee on Shop Practices, C. H. Spence (chairman), superintendent of shops, B. & O.

1. Repairing diesel locomotive trucks
2. Welding on diesel locomotive work
3. Servicing steam power at terminals

Report of Committee on Shop Tools, F. E. Molloy (chairman), superintendent of motive power, S. P.

WEDNESDAY, SEPTEMBER 19

9 a.m.

Report of Committee on Diesel Material Reconditioning and Control, W. R. Sederquest (chairman), superintendent locomotive maintenance, N. Y. N. H. & H.

Report of Committee on Diesel Terminal Facilities, H. H. Niksch (chairman), master mechanic, E. J. & E.

1. Centralized reconditioning facilities
2. Cleaning diesel locomotives
3. Wayside facilities

2 p.m.

Joint sesstion with Mechanical Division, Electrical Section

Address by E. H. Davidson, director, Bureau of Locomotive Inspection, I. C. C.

Report of Committee on Cleaning and Testing Electrical Equipment, W. P. Miller (chairman), superintendent diesel and motor car equipment, C. & N. W.

Railway Fuel and Traveling Engineers' Association

MONDAY, SEPTEMBER 17

10 a.m.

Address by President G. E. Anderson, general fuel supervisor, Great Northern

Coal—Steam Locomotives, by C. M. Moddrell, supervisor fuel and locomotive performance, Northern Pacific

Locomotive Fuel Oil, by T. J. Conway, fuel supervisor, Texas & Pacific

2 p.m.

Employee and Public Relations on the Railroads, by L. W. Horning, vice-president, personnel and public relations, N. Y. C.

Passenger Train and Freight Train Handling—Dynamic Braking, by F. T. McClure, general supervisor air brakes, A. T. & S. F. (In joint meeting with Air Brake Association)

Water Treatment—Steam and Diesel Locomotives, by I. C. Brown, chief water engineer, St. Louis-San Francisco

TUESDAY, SEPTEMBER 18

9 a.m.

Diesel Fuel Oil—Loss of Fuel, by O. D. Teeter, fuel supervisor, Denver & Rio Grande Western

Address by E. H. Davison, director, Bureau of Locomotive Inspection, I. C. C.

Operation of Fairbanks-Morse Diesels, by R. D. Nicholson, road foreman, N. Y. N. H. & H.

Education of Locomotive Operating Personnel, by G. B. Curtis, road foreman of engines, Richmond, Fredericksburg & Potomac

Avoidable Train Delays with Diesel Power, by W. H. Fortney, chief road foreman of engines, N. Y. C.

WEDNESDAY, SEPTEMBER 19

9 a.m.

Operating Difficulties Encountered on Line of Road, by W. H. Powell, supervisor of locomotives, operation, B. & O.

Gas Turbine Locomotives, by R. A. Williamson, manager, railroad rolling stock division, General Electric Company

Steam Generators—Elesco and Clarkson Vapor, by F. Thomas, assistant to general superintendent of equipment—diesels, N. Y. C.

Election of officers

2 p.m.

Safety in Train Operation

Air Pollution, by Glenn Warner, fuel supervisor, Pere Marquette district, Chesapeake & Ohio

Electrical Sections—A.A.R. Mechanical and Engineering Divisions

MONDAY, SEPTEMBER 17

10 a.m.

Address by H. F. Finnemore (chairman, Engineering Division), chief electrical engineer, C. N.

Address by L. C. Bowes (chairman, Mechanical Division), electrical engineer, Chicago, Rock Island & Pacific

Unfinished and new business (Mechanical)

Election of officers (Mechanical)

Engineering Division

Report Joint Committee Wire, Cable and Insulating Materials

Report of Joint Committee on Power Supply

2 p.m.

Engineering Division

Report of Committee 2—Electrolysis

Report of Committee 3—Overhead Transmission and Catenary Construction

Report of Committee 9—Track and Third Rail Bonds

Report of Committee 10—Illumination

Mechanical Division

Report of Committee on Application of Radio and Communicating Systems to Rolling Stock

Report of Joint Committee on Electrical Facilities and Practices for Repair Shops

Report of Committee on Wiring Diagrams for Rolling Stock

TUESDAY, SEPTEMBER 18

9 a.m.

Engineering Division

Unfinished business

New business

Report of Committee 11—Electric Heating

Mechanical Division

Report of Joint Committee on Welding and Cutting

Report of Committee on Car Electrical Equipment

WEDNESDAY, SEPTEMBER 19

9 a.m.

Mechanical Division

Report of Committee on Car Air-Conditioning Equipment

2 p.m.

Mechanical Division

Report of Committee on Automotive and Electric Rolling Stock (In joint session with L. M. O. A.)

Malleable Founders' Society To Meet September 20-21

The Malleable Founders' Society will meet at the Hotel Cleveland, Cleveland, on September 20 and 21. Special significance is attached to this meeting because 1951 is the 125th anniversary of the malleable iron industry in the United States. Malleable iron was first made in this country on July 4, 1826, at Newark, N. J., by Seth Boyden.

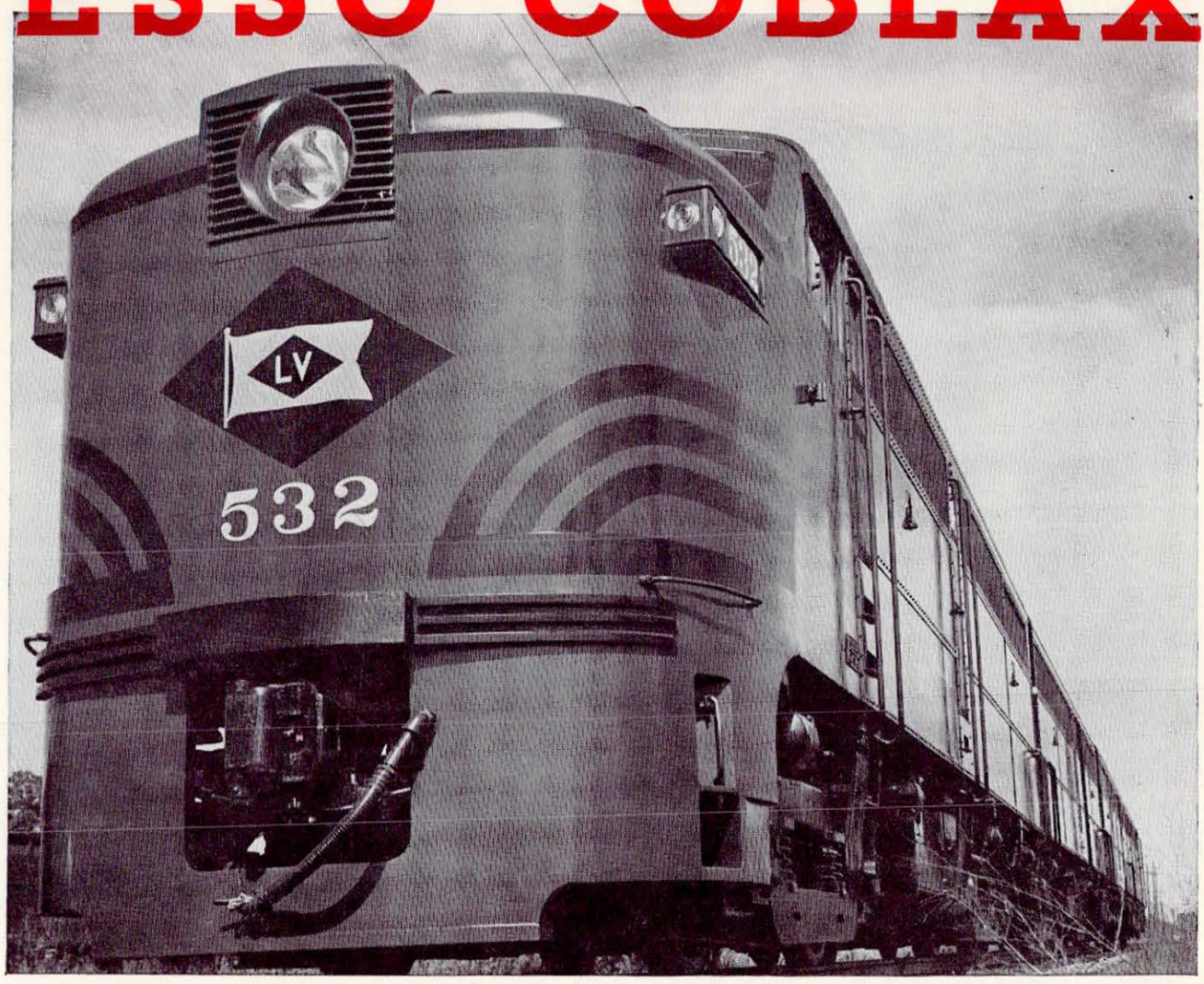
Several sessions of the meeting will be devoted to speeches on workers' safety and compensation, technical discussion of a shell molding process, and matters relating to the present national economy and government directives, as well as to discussion of the society's internal affairs. It is tentatively planned to have a prominent public personage address a luncheon gathering on September 21.

The **Trans-Missouri-Kansas Shippers Board** will hold its next meeting in Tulsa, Okla., September 19 and 20. All sessions will be held in the Hotel Mayo. Earl B. Smith, vice-president of General Mills, Inc., Minneapolis, will be the guest speaker at a joint luncheon session on the 20th, sponsored jointly by the T-M-K Board, the **Tulsa Traffic Club** and the **Tulsa Chamber of Commerce.**

Fred Carpi, vice-president in charge of traffic of the Pennsylvania, at Philadelphia, will be guest speaker at the 65th regular meeting of the **Allegheny Regional Advisory Board,** on September 13. The meeting was announced in *Railway Age,* September 3, page 84.

The **Great Lakes Regional Advisory Board** will hold its next meeting on September 25 and 26, at the Hotel Statler, Detroit. Hon. Albert E.

ESSO COBLAX



"Tailor-made" to railroad specifications

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RAILROAD PRODUCTS

SOLD IN: Maine, N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Penna., Del., Md., D. C., Va., W. Va., N. C., S. C., Tenn., Ark., La.

ESSO STANDARD OIL COMPANY — Boston, Mass. — New York, N. Y. — Elizabeth, N. J. — Philadelphia, Pa. — Baltimore, Md. — Richmond, Va. — Charleston, W. Va. — Charlotte, N. C. — Columbia, S. C. Memphis, Tenn. — New Orleans, La.

ESSO COBLAX LUBRICANTS

have been specifically developed to provide highly dependable gear lubrication for traction motor drives on electric and diesel-electric locomotives; gas electric and multiple-unit cars; and many other locomotive and car lubrication requirements. Esso COBLAX is availabe in a wide range from fluid oils to semi-solid products... "tailor-made" for railroad applications.

BACKED BY CONSTANT RESEARCH

—keeping pace with latest engine design and developments. Esso Railroad Products are constantly being tested and improved.

BACKED BY CONSTANT FOLLOW-UP

—on-the-job check-ups by Esso Sales Engineers assure dependable performance of Esso Railroad fuels and lubricants! Be sure to call on ESSO for any fuel or lubricating problem.

Cobo, mayor of Detroit, will be guest speaker at the luncheon session on the 26th, which will be co-sponsored by the **Traffic Club of Detroit.**

"A Centennial of Railroad and University Frontiers" will be the subject of an address by Kenneth F. Burgess before the **Traffic Club of Chicago,** the **American Society of Traffic & Transportation** and **Northwestern University** on September 14. Mr. Burgess, is president of the board of trustees of the university, which is currently celebrating its centennial. The three organizations will hear Mr. Burgess in the Red Lacquer room of the Palmer House at the conclusion of a luncheon which is to begin at 12:15 P.M.

SUPPLY TRADE

Frederick C. Fiechter, formerly with the **Pennsylvania Co. for Banking & Trusts,** has joined the Philadelphia law firm of **Freeman, Fox & Fiechter.** Mr. Fiechter is the author of *Railway Age* articles on Financing Railroad Equipment Purchases (February 7, 1948, page 46) and A Way to Get New Capital to Finance Improvements in Railroad Plant (July 30, 1949, page 50).

W. G. Wehe, formerly on the operating vice-president's staff of the **Graybar Electric Company,** at New York, has been appointed district operating manager, at Detroit. Mr. Wehe succeeds **M. O. McIllvain,** who is on sick leave.

Paul L. Wright has been appointed sales manager of the Buffalo, N. Y., plant of **Joseph T. Ryerson & Son, Inc.** Mr. Wright formerly was office manager, in which capacity he served also as supervisor of the company's inside sales department.

Bowser, Inc., 33 North LaSalle street, Chicago, has acquired ownership of the **National Scientific Laboratories, Inc.,** 2010 Massachusetts avenue, N. W., Washington, D. C. **Robert I. Sarbacher,** president of National, has been appointed also director of research for Bowser, and will head the product development work of all subsidiary companies. There will be no changes in laboratory personnel.

J. W. Peterson has been appointed general traffic manager of the **Air Reduction Company,** succeeding **H. W. MacArthur,** retired.

The Hyatt Bearings division of **General Motors Corporation** has completed preliminary plans for expansion of manufacturing areas in its Harrison, N. J., and Clark Township plants. New structures at the Clark Township plant will provide an additional 390,000 sq. ft. of floor space, doubling existing facilities, and alterations to the Harrison plant will provide an additional 12,000 sq. ft. of manufacturing area.

The **American Steel & Wire Co.** has appointed **Thursman Haskell** as special representative in the western area sales department, with headquarters in Chicago. Mr. Haskell has been with the company (a subsidiary of U. S. Steel) since 1919. He has served as sales manager at Salt Lake City and at Denver.

The **Robert W. Hunt Company,** engineers, have announced that **W. H. Bolger** has been advanced to manager of laboratories and **Cromwell Bowen** to assistant manager of laboratories.

The **Chicago Steel Service Company** has appointed **Walter H. Creber, Jr.,** as manager of sales.

John F. Ducey, Jr., and **S. R. Watkins** have been appointed assistant vice-presidents in the sales department of the Brake Shoe & Castings division of **American Brake Shoe Company.** Both men formerly were district sales managers for the division.

OBITUARY

Harry W. Renick, vice-president of the Brake Shoe & Castings division and the Ramapo Ajax division of the American Brake Shoe Company, died on August 24, in Los Angeles, after a month's illness. Mr. Renick organized his own frog and switch company and later joined the Elliott Frog & Switch Co. of St. Louis, which became a part of American Brake Shoe. He also was organizer and president of the Magnetic Signal Company, which company also was purchased by American Brake Shoe and later sold by them.

EQUIPMENT AND SUPPLIES

FREIGHT CARS

The **Burlington Refrigerator Express Company** has ordered 100 50-ton refrigerator cars from the Pacific Car & Foundry Co.

The **Western Fruit Express Company** has ordered 300 refrigerator cars from the Pacific Car & Foundry Co.

LOCOMOTIVES

The **Boston & Maine** has ordered 39 diesel-electric locomotive units. Eleven 1,600-hp. road-switching and 12 660-hp. switching units will be built by the American Locomotive-General Electric Companies and seven 1,200-hp. switching and nine 1,500-hp. road-switching units by the Electro-Motive Division of General Motors Corporation. Deliveries are expected to begin next January.

PASSENGER CARS

The **Long Island** has requested bids for double-deck 132-passenger coaches similar to 63 it already has in service, and for modified single-deck coaches of a new 3-2 seat type, each of which would be longer than present single-deck cars and should seat nearly as many passengers as a double-deck car. At least 20 cars of one type or the other will be purchased. (See Financial News columns.)

SIGNALING

The **Central of Georgia** has ordered from the Union Switch & Signal Division of Westinghouse Air Brake Company material to extend the Payne-Collier (Ga.) C.T.C. installation to Barnesville, Ga., approximately 10 miles. The new extension will be controlled from the existing style C machine at Macon, Ga., division headquarters, approximately 42 miles east of Barnesville. In addition to material required to add controls to the existing machine, the order includes styles H-2 dwarf and high searchlight signals, M-23A dual-control electric switch machines, T-21 switch stands, code equipment, relays, rectifiers, transformers and housings. Field installation will be handled by railroad forces.

CONSTRUCTION

Long Island Outlines $14,000,000 Program

The Long Island has adopted a $14,000,000 program of capital improvements for 1951-52, Trustee William H. Draper, Jr., revealed at a September 4 hearing in Brooklyn Federal Court, where approval was received for a proposed agreement under which the Metropolitan Life Insurance Company will provide $4,500,000 for new passenger cars and locomotives. (See Financial and Equipment & Supplies columns elsewhere in this issue.)

Included in the overall improvement program is the previously announced $6,000,000 outlay for installation of automatic speed control and automatic trippers. (*Railway Age*, January 15, page 247.) Installation of trippers on

(Continued on page 67)

Welcome as an old friend... DIXIE CUPS

Dixie Cups are literally 'old friends' to millions everywhere. No other paper cup is more popular . . . especially to travelers by rail. Since paper cups were first introduced on trains over a quarter of a century ago the name Dixie Cup has become the leader in the field.

To *your* passengers a Dixie Cup is an invitation to a refreshing drink . . . made even more appetite-appealing by the confidence that a Dixie is always clean . . . always safe. By using only genuine Dixie Cups you afford your passengers the *best* in service with the name they *know* best.

DIXIE RAILROAD SERVICE EQUIPMENT IS COMPLETE

For all passenger service there is modern Dixie equipment available for every type of installation. Exclusive Dixie equipment features permit interchangeable use of either flat-bottom Dixies or cone-shaped Vortex Cups in large or small sizes.

Write to Railroad Department

DIXIE CUP COMPANY
Easton, Pa.

"Dixie" and "Vortex" are registered trade marks of the Dixie Cup Company

RECESSED DISPENSER

Fits flush in bulkhead . . . modern to the "nth" degree in lustrous satin-chrome finish. Exclusive Dixie adaptors permit interchangeable use of flat-bottom Dixies or cone-shaped Vortex Cups . . . large or small.

STREAMLINER

Trim, smart, mounts easily . . . anywhere. Holds flat-bottom Dixies or cone-shaped Vortex Cups . . . either small or large.

SPACE SAVER

For bedrooms, roomettes, wherever space is at a premium.

Special imprinting of cups with your insignia, slogan, name or other message to your order.

STANDARD IN RAILROAD SERVICE FOR OVER 30 YEARS

HALF A

MILES O

THIRTEEN years ago the Budd Company found that available braking equipment was not adequate for its new concept of railway passenger cars. So Budd designed a new brake . . . the Budd railway passenger car *disc* brake.

Half a billion miles of use by twenty railroads in high speed passenger service, and under extreme conditions, have proved this brake that *does not* bear on the rim provides matchless efficiency and economy.

Stops are quiet, smooth, fast. Brake shoes last an average of 100,000 miles where on other brakes they require changing in 6,000 miles. There has never been a heat checked wheel . . . car weight is cut more than 1,000 lbs. . . . wheel life is often more than doubled.

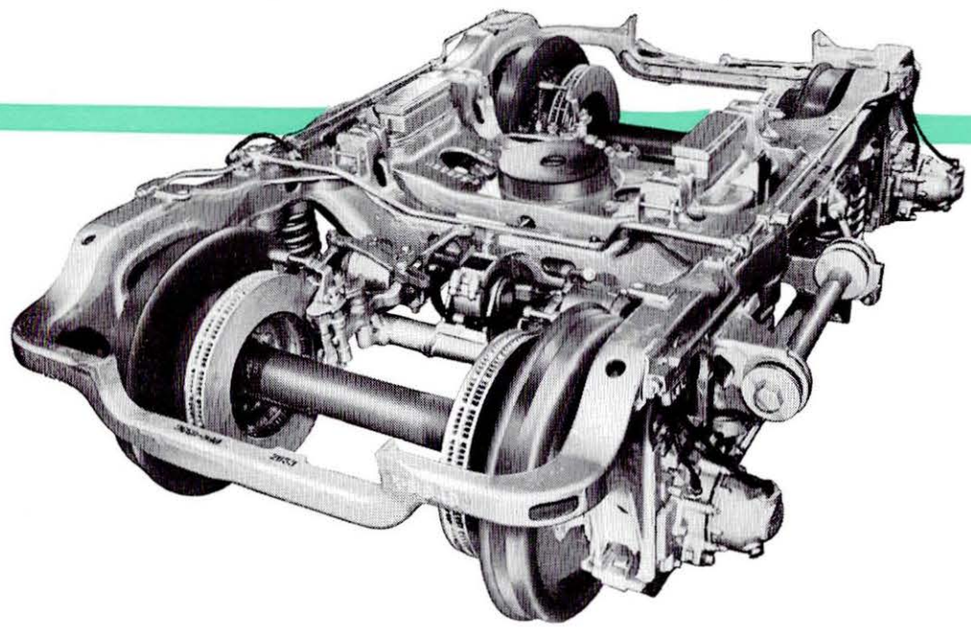
Budd Model CF disc brakes are adaptable for installation on new equipment of all manufacturers, and for converting existing equipment.

The Budd Company, Philadelphia 32

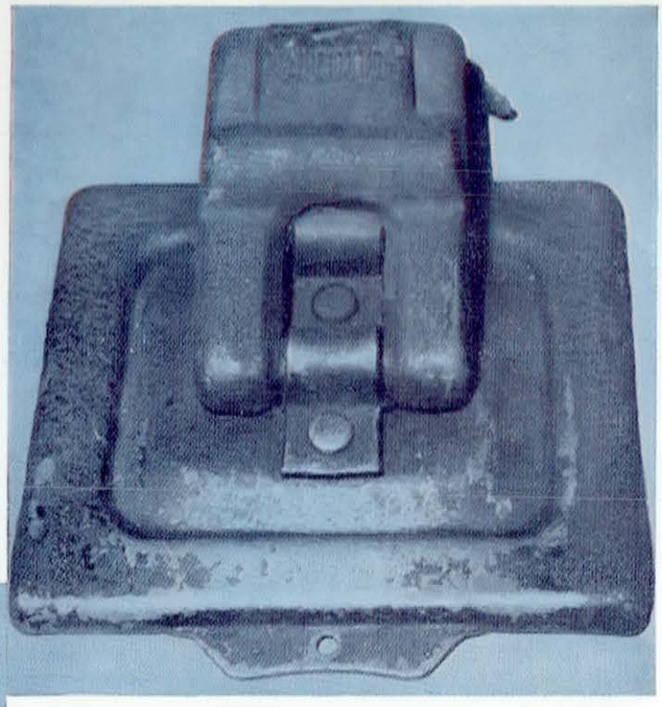
Budd

BILLION

F PROOF!



251,811 miles of wear in passenger service for this ALCOLID



and still

no pin rotation

no eye elongation

That's right—this ALCOLID served the equivalent of 17 years of freight service—and still held up with only negligible evidences of wear.

Reason? ALCOLIDS are designed to give a *lifetime* of service. Here is proof positive that the square headed, locked retaining pin never rotates, thus eliminating wear on the eyes of the hood. Elimination of eye wear prevents loss of lids and—coupled with the fact that a sturdy torsion spring locks the cover tight—prevents lid vibration. An ALCOLID is installed in a matter of seconds.

Put all these features to work for *you*. Send for complete details to your Alco sales representative in New York, Cleveland, Chicago, St. Louis, St. Paul, San Francisco.

ALCOLID

RAILWAY STEEL-SPRING DIVISION

AMERICAN LOCOMOTIVE COMPANY

(Continued from page 62)
the Atlantic Avenue branch was completed last May.

Other items in the program, and their estimated costs, are: Purchase of at least 20 new passenger cars and possible purchase of a large diesel tug ($3,600,000); purchase of 13 diesel locomotives, all previously ordered from Fairbanks, Morse & Co., and one of which was acquired earlier this year ($2,300,000); improvements in grade crossing protection, including installation of automatic crossing gates and flashing lights, some of which has been completed ($750,000); new bridges and other roadway improvements, installation of heavier rail and stone ballast, and fireproofing Long Beach trestle ($450,000); new and expanded electric power distributing sub-stations, including new substation under construction at Island Park and also including provisions for increasing capacity of other power facilities ($500,000); and improvements in shop structures and new shop machinery, including new diesel service and repair facilities at Richmond Hill and Morris Park, new steam generators for heating passenger cars at Richmond Hill, a new heavy-duty overhead crane at Morris Park and additional heavy machinery for maintaining diesel locomotives ($400,000).

Chicago, Rock Island & Pacific.—The description of this company's main line relocation project between Atlantic, Iowa, and Council Bluffs, on page 72 of the August 20 *Railway Age*, gave the cost as $17,453,554. This should have read $7,453,554.

New York Central.—This road, preparing for complete dieselization of its 580-mile St. Lawrence division, has begun construction of facilities for servicing diesel-electric locomotives at Watertown, N. Y. A yardmaster's office with connecting building providing crew quarters, a 1,000,000-gal. fuel storage tank, and several additional yard tracks also are being constructed. The new buildings and tracks will be in Massey Street yard, about 3 miles south of the Watertown station. When completed, the intermediate Pine Street yard will be largely abandoned and its steam engine terminal and coal dock will be demolished. Work on all new facilities will be sufficiently completed before the end of the year to permit their use in part this winter.

West Jersey & Seashore (Pennsylvania).—In its recent order authorizing abandonment of Delaware river ferry service between Philadelphia, Pa., and Camden, N. J., the I.C.C. also authorized this road and its lessee, the Pennsylvania-Reading Seashore Lines, to relocate existing trackage in Camden. A 1.02-mile segment of the so-called Cooper's Point Branch will be abandoned. This segment crosses 14 streets at grade, and the city has been actively seeking its elimination. The substitute line to Cooper's Point yard will require construction of two segments, totaling 0.5 mile, along Delaware avenue. Funds for this project, estimated at $1,696,000 will be supplied by New Jersey and the Delaware River Joint Commission. In addition to the new trackage, the P.-R.S.L. will operate over a 0.87-mile segment belonging to the New Jersey Railroad & Canal Co., in reaching Cooper's Point yard.

As noted in *Railway Age* August 27, page 60, the P.-R.S.L. and the Delaware River Joint Commission plan to enlarge and modernize the railroad's Broadway station in Camden at an estimated total cost of $1,140,000.

The Philadelphia-Camden ferry will continue in operation until sufficient facilities are available at Broadway station for proper transfer of passengers between P.R.R. and P.-R.S.L. trains and cars of the Delaware River Bridge Line, according to J. M. Symes, vice-president—operation of the Pennsylvania, and vice-president of the Philadelphia & Camden Ferry Co.

"The railroad will move ahead with the work at Broadway as rapidly as possible," he said, "with progress dependent largely on availability of materials. In the meantime, we will stand the ferry losses and continue its operation as a contribution to the public welfare and interest."

CAR SERVICE

I.C.C. Service Order No. 880, effective from August 27 until September 29 unless otherwise modified, provides that railroads in California may, at their option, furnish passenger-type refrigerator cars of Railway Express Agency ownership for loading perishable commodities; and may transport such loads at freight rates applicable to the same commodities when loaded in standard reefers.

FINANCIAL

Chicago, Burlington & Quincy.—*Trackage Rights.*—This road has asked the I.C.C. for approval of a modified agreement with the Union Pacific, covering operation over about 4.5 miles of U.P. trackage between Gilmore Junction, Neb., and South Omaha. The Burlington has operated over this segment since 1900, but that agreement expired June 30, 1949. The proposed extension, containing only "minor" modifications, would run to June 30, 1999.

Gulf, Mobile & Ohio.—*Trackage Rights into Birmingham, Ala.*— I.C.C. Examiner Jerome K. Lyle has recommended that this road be permitted to acquire a new route into Birmingham, Ala. The plan contemplates acquisition of trackage rights over approximately 55 miles of Louisville & Nashville line between Tuscaloosa, Ala., and Birmingham, and abandonment of operations under trackage rights over 172 miles of Illinois Central and Southern lines between Ruslor, Miss., and Birmingham. Use of L.&N. terminal facilities at Birmingham and abandonment of operations at Southern facilities there are also involved. (*Railway Age*, May 13, 1950, page 68.)

Four roads — the I.C., the Southern, the Alabama Great Southern, and the New Orleans & Northeastern — oppose the plan. Examiner Lyle found, however, that the new arrangement would increase the efficiency and economy of G.M.&O.'s Birmingham operation. Based on present traffic, G.M.&O. estimates it will save $300,000 a year by using the shorter route. The examiner said that, on the whole, benefits to the G.M.&O. and the public "will outweigh an injury which may be inflicted on the protesting railroads"

Under the trackage contract with the L.&N., the G.M.&O. would operate only through freight trains over the 55-mile segment. The G.M.&O. would pay interest rental of $10,416.67 monthly or $125,000 a year, plus other charges based on additions and betterments, taxes, and the like.

Long Island.—*Conditional Sales Agreements.*—William H. Draper, Jr., Long Island trustee, received federal court approval on September 4 for an agreement between the road and the Metropolitan Life Insurance Company whereby the latter will provide $4,500,000 of nearly $6,000,000 to be spent for new passenger cars and diesel locomotives. The agreement provides that not more than 80 per cent of the cost of the equipment will be advanced by Metropolitan under conditional sales agreements with the manufacturers. Funds made available by Metropolitan will be repayable by the L.I. in equal semiannual installments over a 10-year period. The locomotives were ordered last year (*Railway Age*, November 4, 1950, page 93), and the first is scheduled for delivery September 10. Orders for the new passenger cars (see Equipment & Supplies column elsewhere in this issue), will be placed as early as possible this fall. (See also Construction column in this issue.)

Seatrain. — *Acquisition of Ocean Steamship Company.*—The I.C.C. has authorized additional parties to intervene in this proceeding, following the commission's decision denying Seatrain's request for temporary approval. Latest interventions were by the Central of Georgia, urging approval of the Seatrain application, and the Federal

Maritime Board. The maritime board said its interest in the case is in fostering the development of an "adequate" merchant marine. The C. of G. said it favored the proposed Seatrain-type of service between Savannah, Ga., and New York, because it stands to gain "very considerable revenue" from freight interchanged at Savannah. Ocean Steamship Company is a subsidiary of the C. of G., but has not operated under its certificate since World War II.

Dividends Declared

BEECH CREEK.—50¢, payable October 1 to holders of record September 12.

BOSTON & ALBANY.—$2, payable September 29 to holders of record August 31.

CHICAGO SOUTH SHORE & SOUTH BEND.—25¢, quarterly, payable September 15 to holders of record September 5.

MINNEAPOLIS & ST. LOUIS.—25¢, quarterly, payable September 14 to holders of record September 7.

READING.—4% 2nd preferred, 50¢, quarterly, payable October 11 to holders of record September 20.

UNITED NEW JERSEY R.R. & CANAL.—$2.50, quarterly, payable October 10 to holders of record September 20.

New Securities

Division 4 of the I.C.C. has **authorized:**

MISSOURI-KANSAS-TEXAS.—To assume liability for $1,500,000 of equipment trust certificates, to finance in part 13 diesel-electric locomotives costing an estimated $1,875,000. (*Railway Age*, August 20, page 76.) The commission approved sale of the certificates, with a 2¾ per cent interest rate, for 98.0899—the bid of Halsey, Stuart & Co. On this basis the average annual cost of the proceeds will be approximately 2.996 per cent. The certificates, to be dated September 15, will mature in 30 semiannual installments of $50,000 each, beginning March 15, 1952. The certificates were reoffered to the public at prices yielding from 2.25 to 3.05 per cent, according to maturity.

Security Price Averages

	Sept. 4	Prev. Week	Last year
Average price of 20 representative railway stocks	53.64	52.50	45.98
Average price of 20 representative railway bonds	92.31	91.93	95.37

Selected Income and Balance-Sheet Items of Class I Steam Railways in the United States

Compiled from 127 reports (Form IBS) representing 131 steam railways

(Switching and Terminal Companies Not Included)

Income Items	United States For the month of May 1951	1950	For the five months of 1951	1950
1. Net railway operating income	$74,936,576	$67,072,549	$321,485,645	$253,110,892
2. Other income	15,420,737	16,736,997	89,330,400	90,002,539
3. Total income	90,357,313	83,809,546	410,816,045	343,113,431
4. Miscellaneous deductions from income	3,684,107	4,095,288	25,488,417	18,915,059
5. Income available for fixed charges	86,673,206	79,714,258	385,327,628	324,198,372
6. Fixed charges:				
6–01. Rent for leased roads and equipment	9,222,612	11,941,784	47,263,961	48,326,410
6–02. Interest deductions[1]	24,820,229	25,004,663	123,996,374	124,842,872
6–03. Amortization of discount on funded debt	238,690	237,066	1,150,443	1,071,010
6–04. Total fixed charges	34,281,531	37,183,513	172,410,778	174,240,292
7. Income after fixed charges	52,391,675	42,530,745	212,916,850	149,958,081
8. Other deductions	3,166,298	3,121,401	15,370,731	15,956,708
9. Net income	49,225,377	39,409,344	197,546,119	134,001,373
10. Depreciation (Way and structures and Equipment)	36,492,608	35,552,043	182,636,057	175,138,904
11. Amortization of defense projects	4,315,389	1,369,037	15,943,580	6,865,112
12. Federal income taxes	48,373,380	31,473,587	213,531,256	116,054,694
13. Dividend appropriations:				
13–01. On common stock	28,161,650	25,795,150	90,986,899	68,517,380
13–02. On preferred stock	8,442,500	7,372,741	55,105,757	31,202,477
Ratio of income to fixed charges (Item 5 ÷ 6–04)	2.53	2.14	2.23	1.86

Selected Expenditure and Asset Items	United States Balance at end of May 1951	1950
17. Expenditures (gross) for additions and betterments—Road	$120,541,769	$96,940,299
18. Expenditures (gross) for additions and betterments—Equipment	400,092,292	294,501,317
19. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	475,362,978	471,865,850
20. Other unadjusted debits	117,746,643	106,352,905
21. Cash	844,954,976	861,720,508
22. Temporary cash investments	929,910,535	823,437,688
23. Special deposits	110,457,176	119,627,734
24. Loans and bills receivable	1,714,996	1,086,456
25. Traffic and car-service balances—Dr.	57,260,474	55,916,328
26. Net balance receivable from agents and conductors	165,100,080	137,796,176
27. Miscellaneous accounts receivable	475,078,640	265,042,598
28. Materials and supplies	860,382,848	712,223,405
29. Interest and dividends receivable	18,605,492	18,651,625
30. Accrued accounts receivable	229,934,107	170,332,328
31. Other current assets	36,374,039	33,381,191
32. Total current assets (items 21 to 31)	3,729,773,363	3,199,216,037
Selected Liability Items		
40. Funded debt maturing within 6 months[2]	$147,556,291	$140,925,542
41. Loans and bills payable[3]	5,237,500	7,840,112
42. Traffic and car-service balances—Cr.	99,549,955	82,018,278
43. Audited accounts and wages payable	599,647,393	511,490,789
44. Miscellaneous accounts payable	216,256,159	183,750,134
45. Interest matured unpaid	28,922,841	29,802,734
46. Dividends matured unpaid	9,674,561	7,957,716
47. Unmatured interest accrued	73,055,407	72,751,375
48. Unmatured dividends declared	55,735,634	47,203,015
49. Accrued accounts payable	235,115,372	180,616,417
50. Taxes accrued	914,853,516	589,668,728
51. Other current liabilities	86,801,465	102,414,995
52. Total current liabilities (items 41 to 51)	2,324,849,803	1,815,514,293
53. Analysis of taxes accrued:		
53 01. U. S. Government taxes	748,439,952	434,606,256
53 02. Other than U. S. Government taxes	166,413,564	155,062,472
54. Other unadjusted credits	292,400,810	265,588,580

[1]Represents accruals, including the amount in default.
[2]Includes payments of principal of long-term debt (other than long-term debt in default) which becomes due within six months after close of month of report.
[3]Includes obligations which mature not more than one year after date of issue.
Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission
Subject to revision.

RAILWAY OFFICERS

EXECUTIVE

Gardner A. Caverly has been appointed vice-president of the RUTLAND at Rutland, Vt. His responsibilities will include such non-operating administrative activities as accounting, finance, law, real estate, and office management. The directors of the road have decided to leave vacant the position of president until a successor can be found for the late **William E. Navin.** In the meantime, **Lewis A. Putnam,** chairman of the board of directors, will be in charge of all operating activities of the road with the title of chief executive officer. A photograph of Mr. Putnam was published in *Railway Age* August 20, page 8.

Mr. Caverly was born at Laconia,

Gardner A. Caverly

N. H., and was graduated from Northeastern University and Harvard University Graduate School of Business Administration. From 1940 to 1946 he operated the Sargent Roundy Company, manufacturers of farm equipment. Prior to World War II Mr. Caverly was associated with the Bond & Goodwin investment company of Boston and New York. Since 1940 he has been connected with Tucker Anthony & Co., New York, investment bankers. He is a member of the board of directors of the Rutland and was one

SOLIDS

in BOILER CARRYOVER settle on Superheater Tubing and cause unsafe tubing temperatures.

Eliminate this condition with the Elesco Steam Drier System by preventing Boiler Carryover. It is an investment that pays BIG dividends.

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Superheaters • Pyrometers • Injectors • Steam Driers • Feedwater Heaters • Steam Generators • Oil Separators • Welded Boiler Shells • Throttles

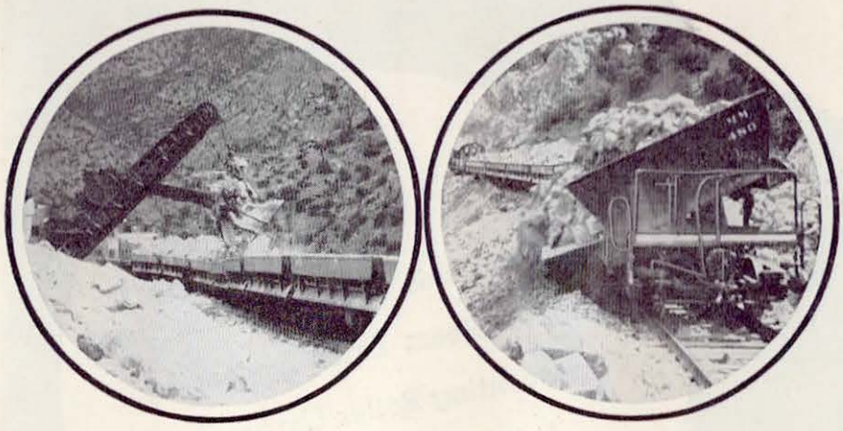
of its three reorganization managers. He is also a member of the Boston Stock Exchange.

J. L. Sorensen, vice-president—operations of the MONONGAHELA CONNECTING, at Pittsburgh, will join the United States Steel Corporation on September 15. Mr. Sorensen will have charge of transportation facilities at U. S. Steel's new Fairless Works at Morrisville, Pa.

FINANCIAL, LEGAL & ACCOUNTING

The CHICAGO & NORTH WESTERN has appointed **Frank J. Klein** as land and tax commissioner, and promoted **Conrad J. Freeman** from the position of general land and tax agent to assistant land and tax commissioner. Mr. Klein succeeds **Roy A. Miller,** who has retired after 47 years of service. Mr. Freeman succeeds **John H. Hoffman,** who has likewise retired. Mr. Klein began his career with the Omaha in 1919 as a valuation clerk in the right of way department at St. Paul. He was appointed right of way and land agent for the Omaha in 1945 and in December 1948 was named to the position of assistant land and tax commissioner for the entire C.&N.W.

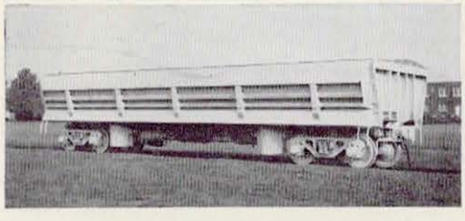
Yes, you're seeing DOUBLE



In fact, when you watch Differential Air Dump Cars in action you're seeing double in several respects —

DOUBLE ACTION — they dump cars both ways, to left or to right. The 50° dumping angle assures a clean dump, and the massive air cylinders (two on each side) assure speedy, reliable dumping power. The double trunnion, double fulcrum design are key features in Differential's amazing performance.

DOUBLE UTILITY — Good for hauling in ore and good for hauling out waste materials. Car is built to withstand abuse and heavy service. If you haul as many as 400 to 500 carloads yearly, the savings with Differential equipment will pay for the cars.



Differential Products Include: Air Dump Cars, Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO

SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

OPERATING

As reported in the July 30 *Railway Age,* **W. C. Preston** has been appointed assistant general superintendent transportation of the GREAT NORTHERN. Mr. Preston began service with the G.N. as clerk at Somers, Mont., in 1917; later held various positions in Montana, Oregon and California; in 1942 became dispatcher at Klamath Falls, Ore.; and in 1947 was advanced to chief dispatcher there. Before his present appointment he had served as chief dispatcher at Whitefish, Mont., since 1948.

W. C. Preston

Richard B. Smith, assistant general manager of the CHICAGO, ROCK ISLAND & PACIFIC, at El Reno, Okla., has been promoted to superintendent of transportation, with headquarters at Chicago. **Robert W. Anderson,** superintendent at Little Rock, Ark., has been transferred to the Rock Island division at Rock Island, Ill. **J. H. Hollenbeak,** terminal superintendent at Armourdale, Kan., moves to Fairbury, Neb., as superintendent of the Western division, succeeding **James C. Geary,** who becomes assistant superintendent at St. Paul, Minn. **John H. Lloyd,** assistant superintendent at Fort Worth, Tex., succeeds Mr. Anderson, and is in turn replaced by **Carl E. Gunnarson,** Mr. Geary's predecessor at St. Paul. **John B. Buffalo,** trainmaster at the Armourdale yards, becomes assistant superintendent there.

F. P. Connolly, superintendent of the NAPIERVILLE JUNCTION, has retired after 44 years of service. The duties of superintendent will be assumed by **R. E. Kendrick,** vice-president, with headquarters at Rouses Point, N. Y.

Samuel L. Price, general superintendent of freight transportation of the NEW YORK CENTRAL SYSTEM at New York, has retired after 50 years of service. Mr. Price was born in 1884 at New York, where he attended City College. He joined the N.Y.C. in 1901 as a clerk in the office of the general

superintendent at New York, later serving as secretary to the general manager and chief clerk in the office of vice-president. During World War I he was secretary to the New York Committee of the American Railway Association (now Association of American Railroads). He was appointed assistant to manager of freight transportation of the N.Y.C. in 1933 and became general superintendent in 1947.

TRAFFIC

L. F. Binkley, assistant general freight agent of the MISSOURI PACIFIC LINES at Omaha, has been promoted to general freight agent at St. Louis, succeeding **W. H. Rabe,** who has retired (*Railway Age*, August 27). **J. N. Clark,** general agent at Lincoln, Neb., succeeds Mr. Binkley, and is in turn succeeded by **J. J. Myers. L. M. Baker,** commercial agent at Cleveland, becomes general agent at Tulsa, Okla., succeeding **H. B. Ward,** who has resigned.

Frank J. Hasson, industrial representative in the office of the vice-president—traffic of the PENNSYLVANIA at Philadelphia, has been appointed industrial agent at New York, succeeding **Arthur A. Metz,** who has been promoted to district freight agent at Canton, Ohio.

Orla F. Asbury, freight traffic agent of the PIEDMONT & NORTHERN at Charlotte, N. C., has been appointed district freight agent at Gastonia, N. C., succeeding **D. C. McIntosh,** who has resigned to engage in other business.

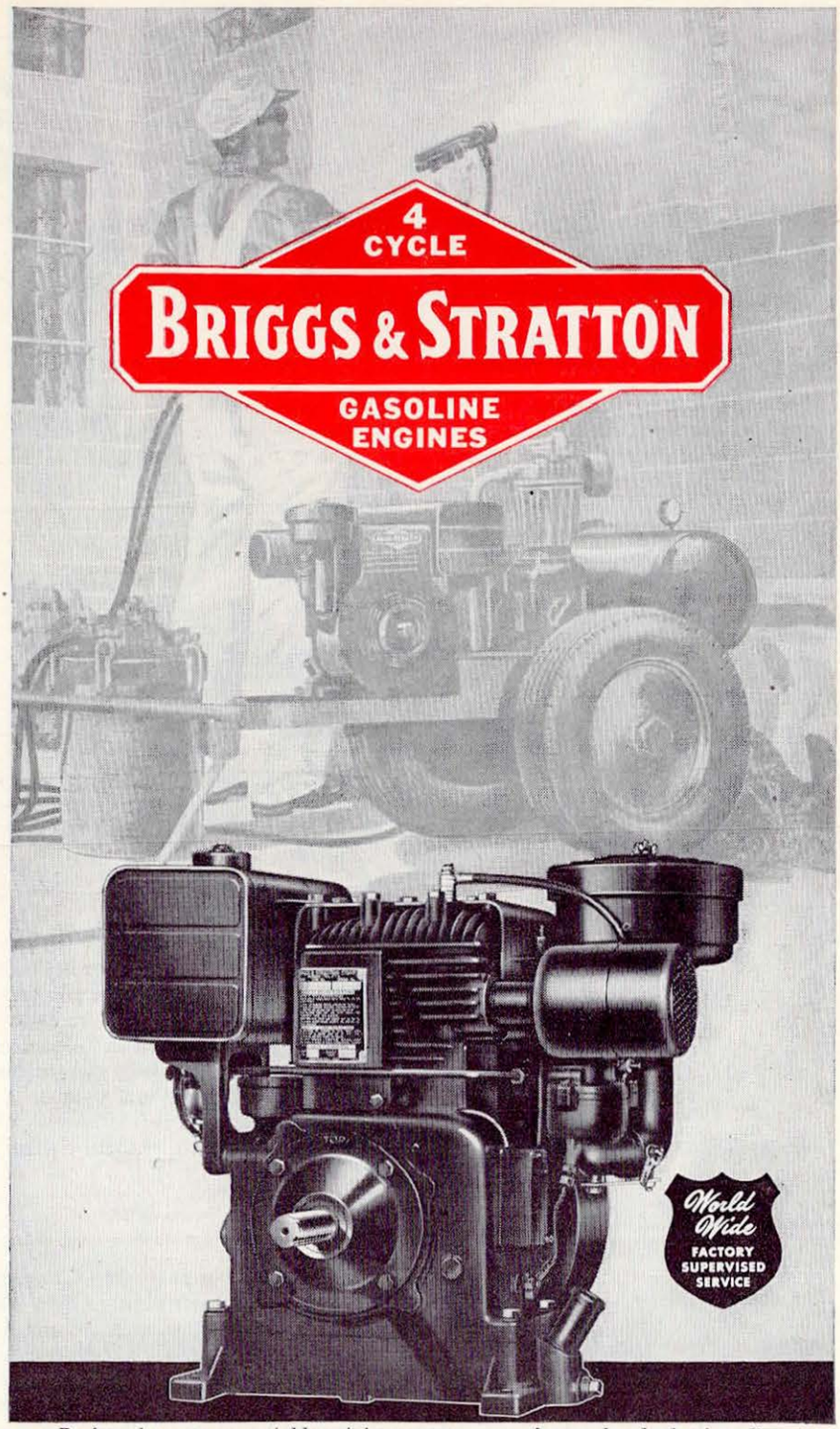
MECHANICAL

Y. T. Guinn, equipment inspector of the CHESAPEAKE & OHIO, at Chicago, has been appointed air brake inspector, at Huntington, W. Va.

P. L. Hofstetter, assistant division master mechanic of the Riverside shops of the BALTIMORE & OHIO at Baltimore, has been appointed master mechanic at Punxsutawney, Pa., replacing **W. F. Dadd,** whose appointment as assistant to the general superintendent of motive power and equipment at Baltimore was reported in *Railway Age* September 3.

D. Beath, master mechanic of the Manitoba district of the CANADIAN PACIFIC, retired from active duty on August 31. He has been succeeded by **J. J. Raby.**

W. P. Gilford, assistant master mechanic of the Hagerstown division of the WESTERN MARYLAND, has been promoted to master mechanic of the Elkins division at Cumberland, Md., succeeding **George R. Lyming,** who has retired because of ill health, after 38 years of service with this road.



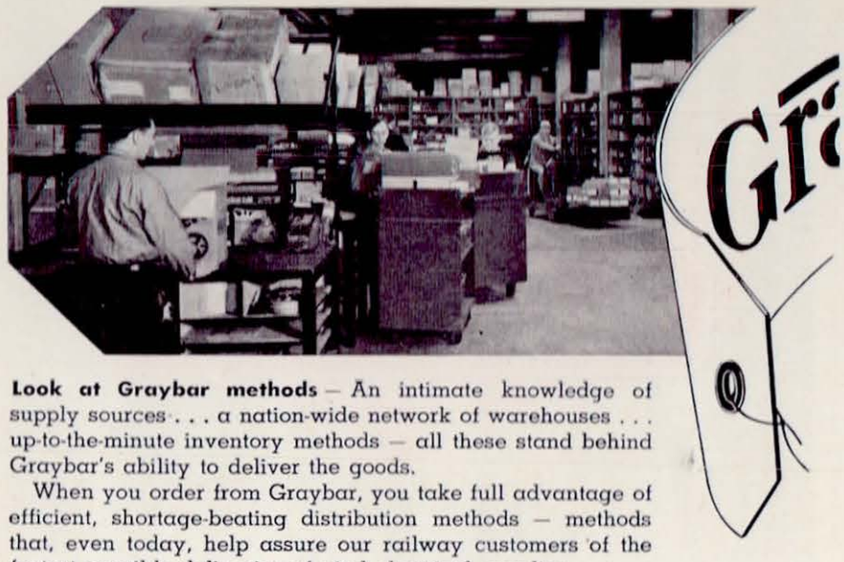
Preferred power on portable paint-sprayers — one of many hundreds of applications on machines, tools, appliances for industry, construction, railroads, oil-fields, and on equipment and appliances for farm and home.

THE sure way to get the best in air-cooled power — insist on Briggs & Stratton, the recognized leader. No other single-cylinder, 4-cycle, air-cooled engines are so universally preferred by manufacturers, dealers and users alike.

Briggs & Stratton Corporation,
Milwaukee 1, Wisconsin, U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

(Railway Officers continued on page 72)

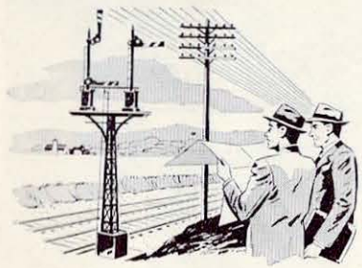


Look at Graybar methods — An intimate knowledge of supply sources . . . a nation-wide network of warehouses . . . up-to-the-minute inventory methods — all these stand behind Graybar's ability to deliver the goods.

When you order from Graybar, you take full advantage of efficient, shortage-beating distribution methods — methods that, even today, help assure our railway customers of the *fastest possible* deliveries of vital electrical supplies.

To speed procurement of electrical items —

Look behind the Graybar tag



Look at Graybar men—Graybar Railroad Specialists will be glad to give you technical assistance on any electrical problem. Long familiarity with electrical products enables them to help you get jobs done efficiently and without delays.

Local Graybar Representatives — always close at hand — can furnish up-to-the-minute forecasts of local delivery conditions and material availability.

Look at Graybar materials — Graybar distributes the products of more than 200 of the nation's leading manufacturers. As an all-inclusive source of "everything electrical" Graybar can measurably simplify procurement of telephone and telegraph equipment . . . pole-line supplies . . . indoor and outdoor lighting . . . motors and power supply items.

A comprehensive catalog and quotation service covering them all is constantly available to help you compile job specifications and estimates. *Graybar Electric Co., Inc. Executive Offices: Graybar Building, New York 17, N. Y.* 193-209

OFFICES AND WAREHOUSES IN OVER 100 PRINCIPAL CITIES

PURCHASES & STORES

Walter U. Palmer, division storekeeper of the SOUTHERN at Asheville, N. C., has been transferred to Somerset, Ky., succeeding **Carl A. Hoover,** who replaces the late **Raymond C. Nicholson** as traveling storekeeper at Washington, D. C. **Joe Shugart,** storekeeper at Memphis, Tenn., has been appointed division storekeeper at Asheville, succeeding Mr. Palmer.

W. J. Beckel has been appointed district storekeeper for the CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC at Aberdeen, S. D. In his new capacity, Mr. Beckel will have jurisdiction over matters pertaining to bridge and building lumber requirements of the Milwaukee's entire system. Mr. Beckel has been with the Milwaukee since 1918 and has been a division storekeeper since 1943.

ENGINEERING AND SIGNALING

Walter E. Fuhr, division engineer of the CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC at Miles City, Mont., has been transferred in that capacity to Savanna, Ill., succeeding **Martin L. Bardill.** Mr. Bardill moves to Terre Haute, Ind., where he replaces **Roger W. Middleton,** who in turn succeeds Mr. Fuhr.

L. L. Adams, assistant chief engineer of the LOUISVILLE & NASHVILLE, has been appointed chief engineer, with headquarters as before at Louisville, Ky., succeeding **C. H. Blackman,** who has retired after more than 50 years of L. & N. service. **H. C. Forman,** special engineer at Louisville, succeeds Mr. Adams as assistant chief engineer.

William T. Wellman, consulting architect for the UNION PACIFIC at Omaha, retired from active duty on August 31. Mr. Wellman first joined the U.P. at Omaha 33 years ago as a draftsman. He remained in that city throughout his entire career, moving through the positions of architectural draftsman, architect, bridge and structural draftsman and designer, to that of general architect in 1941. He was the architect for such structures as the Omaha Union Station, Grand Canyon Lodge, the resort at Sun Valley, Idaho, and U.P. facilities in southern Utah national parks. Mr. Wellman has held the title of consulting architect for that road since January 1950.

OBITUARY

A. R. Malcolm, 75, who retired in December 1945 as traffic manager of the UNION PACIFIC at Detroit, died in St. Joseph's Hospital, Milwaukee, on August 27.

Big Red TD 24

Helps Build Norris Yards

UP AND OVER DOWN IN DIXIE. Here come three Big Red International TD-24s—the most powerful crawlers on the market—scraping down the sticky, wet clay to build the Southern's huge new Birmingham yard.

Three big International Champs grade new $1,700,000 yard in Birmingham, Alabama, for the Southern Railroad

Down in Birmingham, Alabama, the Southern Railroad's new Ernest Norris Yard is taking shape fast. Three Big Red International TD-24s are moving 4,000 cubic yards a day—on an average 2,000-foot cycle in heavy, wet clay—stepping out to help finish the 1,500,000 cubic-yard job on schedule in spite of bad weather.

Superintendent Akin, of the MacDougald Construction Co., gives the straight story: "These TD-24 crawlers are loaded with power. But we think the prime point is the high speed of a TD-24 even with a heavy load!"

It's the stand-out Champ for sure, with 148 drawbar horsepower, eight speeds forward, eight reverse . . . with synchro-mesh transmission . . . and high-low shift without declutching.

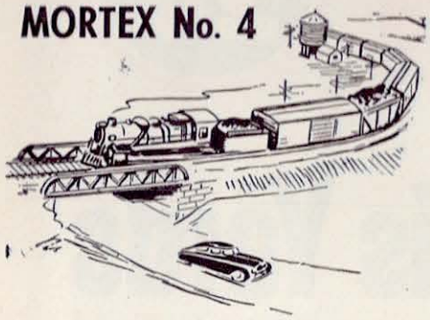
Get the real low-down from your International Industrial Distributor. You'll be a TD-24 man from then on in!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

INTERNATIONAL — INTERNATIONAL HARVESTER

POWER THAT PAYS

CONSERVE
ROLLING STOCK, YARD and Right-of Way EQUIPMENT with MORTEX No. 4



- Protects against rain and moisture
- Protects gainst salt brine
- Protects against acid and alkali fumes
- Odorless
- Non-toxic
- Vermin-proof

One application of this tested coating is far superior to paints and cut-back asphalt products. Its the most practical low-cost rust preventive for roofs, interiors and underframes of steel freight and refrigerator cars, covered hopper cars used for soda ash, lime and similar products, ice bunkers and equipment exposed to acid fumes and gases.

Its' tops for steel bridges, cooling system ducts and sumps, outside storage tanks, tool houses and bins.

Will not run, sag, blister or craze at temperatures up to 250° F.

EASY TO APPLY

Mortex No. 4 can be put on with brush, trowel or spray. It adheres to any clean dry surface and forms a rich, dull black finish.

TRY IT YOURSELF

Most railroads get Mortex No. 4 in 55 gallon drums, but you can order either a 1-gallon or a 5-gallon can and put it through your own comparative tests.

Write for literature

J. W. MORTELL CO.

Technical Coatings since 1895

563 Burch St., Kankakee, Ill.

Current Publications

PAMPHLETS

What About Freight Equalization and Delivery Allowances?, by H. G. Huhn. Reprinted from May and June issues of Distribution Age. A. B. C. Articles, 326 North Court St., Crown Point, Ind. Single copies, $1; 10 or more, 75 each, postpaid.

In distribution, the price system works to eliminate inequalities. But in one phase of distribution — transportation — price equalization is suspect. In attempting to answer the question propounded in the title, the author reaches the following conclusions: Commodities fall almost automatically into four pricing categories (auction pricing, bid and contract pricing, list and discount pricing, and negotiation pricing); competition drives toward price ranges on some goods and toward uniform prices on other goods; freight costs cannot be handled alike in every line of business; equalization broadens trade and benefits every individual; "bids" and "quotations" are different things; and, buyers are not weaklings, sellers are not pirates (nor vice versa in dull times). "Generally speaking," Mr. Huhn says, "there are good reasons for the many varying methods of disposing of freight inequality and we can safely leave these matters to the business men concerned. Any unnatural means employed will soon fall of its own weight. When we block out the full facts clearly, we usually at the same time produce the logical solution. If any fault is to be found with the happenings during the last few years on equalization and basing point matters it can only be that the full facts have not been presented. This may very well be because those concerned have been so close to the operation that they could not present a clearer picture of it."

Your Popular Mechanics Picture Guide to A-Bomb Protection. 32 pages, illustrations. Popular Mechanics Company, 200 E. Ontario St., Chicago 11. 15 cents.

A handy pocket-size booklet to help the average person understand the dangers of the A-bomb, to keep him from becoming panic-stricken, and to tell him what to do to protect himself from the effects of the bomb. The facts are told simply and are illustrated with photographs and cartoons.

The Story of the Bill of Lading, by Chas. W. Braden. 18 pages. National Distillers Products Corporation, 120 Broadway, New York 5. Free.

A brief study of the historical development of the bill of lading and the laws associated with it.

The Bituminous Coal Story. 16 pages, illustrations. Map of Coal Areas in the United States. Folder. Bituminous Coal Institute, Southern bldg., Washington 5, D. C. Free.

The first booklet traces the formation of coal through changes in the composition of the earth's crust, explains differences in the various kinds of solid fuels, reviews the history of the use of coal, and describes America's highly mechanized bituminous mining system that accounts for production in excess of one-half billion tons annually. Referring to modern mines as "mass production factories," the booklet outlines operations in both underground and surface mining. It also explains the functions of a preparation plant, where coal is sorted, washed, and screened before it is sent to market. The companion piece map-pamphlet shows that 31 states have minable coal deposits with most of the bituminous resources lying in the central states and the Appalachian region. It also shows that 91 per cent of the country's total energy reservoir is made up of coal, much of which will be used as a source of liquid and gaseous fuels when petroleum and natural gas, which together comprise less than two per cent of all energy reserves, are exhausted.

The CED Program to Control Inflation; A Progress Report, by Marion B. Folsom. 14 pages. Committee for Economic Development, 444 Madison Ave., New York 22. Free.

Mr. Folsom, in his address to the CED board of trustees at the semiannual meeting in Washington, May 10, outlined the CED five-point program against inflation: (1) Production must be increased; (2) economies must be made in the federal budget; (3) taxes must be increased to balance the cash budget and to help drain off excess purchasing power; (4) strong monetary action must curtail inflationary expansion of credit; and (5) an intensive campaign to encourage saving must be inaugurated. He then took "a look at the record" to see how much progress has been made in putting these five measures into effect, and closed by referring to the role which he thinks CED should play in the present situation.

Safety Pays the Smaller Business. 23 pages, illustrations. National Safety Council, 425 N. Michigan ave., Chicago 11. Single copies free.

Although not aimed specifically at railroads, this pamphlet might prove useful to short line and to smaller switching and terminal company officers, as it suggests ways in which a continuous and extensive safety program may be maintained without the need of a safety specialist or safety department. Numerous recommendations for accident prevention practices, periodic inspections and accident analysis are contained in the booklet, which also describes sources of information and assistance on safety matters additional to the services of the council. The council's interest in promoting safety among smaller business enterprises is based on the fact that more than two-thirds of all industrial workers injured are employed by firms averaging fewer than 100 workers.

The Building of Mid-America. 44 pages, illustrations. Illinois Central Railroad Company, 135 E. 11th pl., Chicago 5. Free.

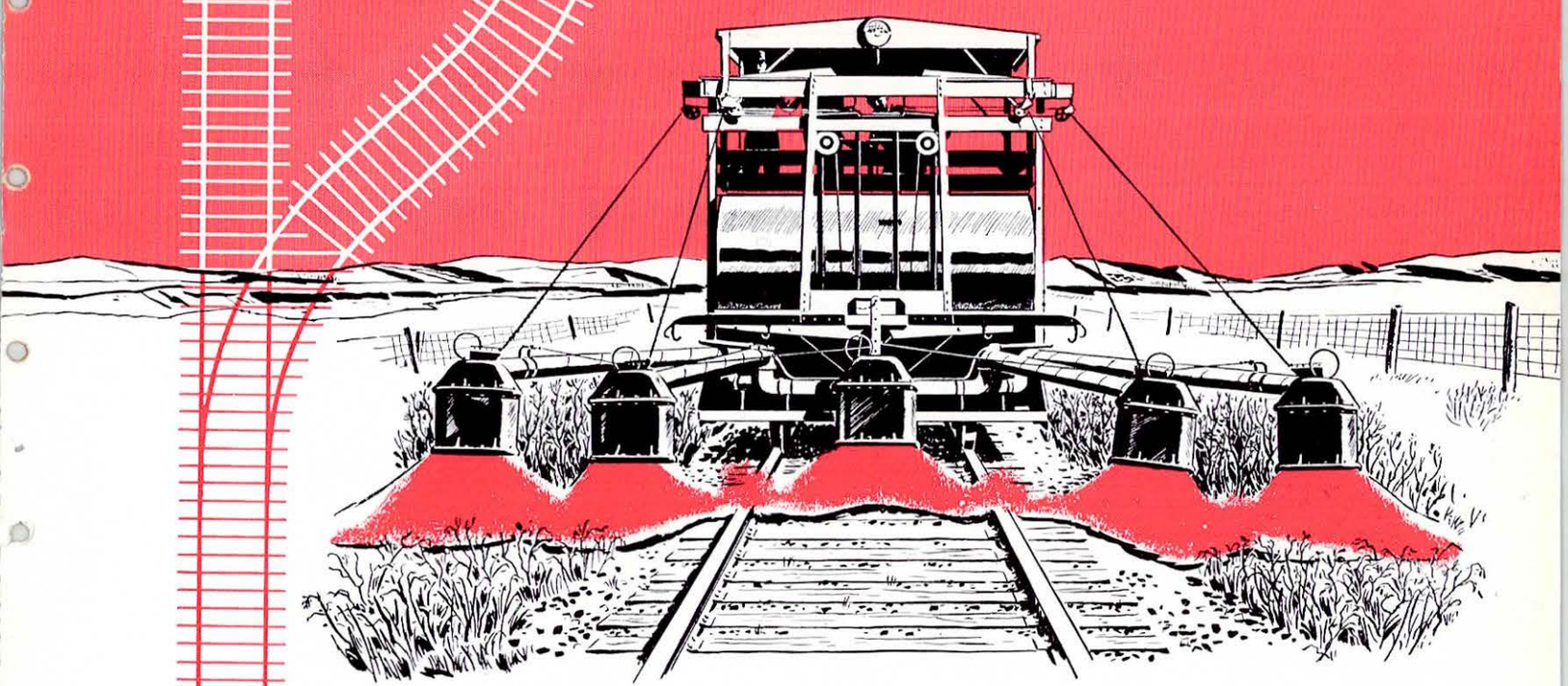
A series of 20 short stories of the Illinois Central of today and yesterday as they might have come from the lips of a young, fifth-generation I.C. "rail." The stories deal

(*Continued on page 77*)

Fairmont

RAILWAY MOTOR CARS
AND WORK EQUIPMENT

. . . the year-'round workman



Fairmont's W55 Series A Weed Burner is a typical example of Fairmont's effort to bring greater versatility to railway maintenance equipment. Long regarded as one of the most thorough and efficient open flame weed killers, this remarkable burner distributes an intense flame which destroys vegetation regardless of roadbed contour. Furthermore, the unusual flexibility of the unit, permitting quick and easy changing of the burner head positions, its solid construction and its unusual operating economy, make it perfect for a second job as well—that of keeping switches and retarders clear of excessive snow during the winter months. This year-'round workman is still another excellent example of Fairmont's success in building to perform *on the job.*

Performance
ON THE JOB
COUNTS

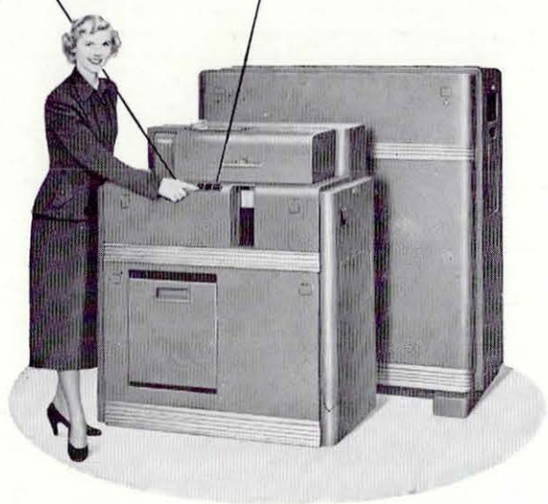
FAIRMONT RAILWAY MOTORS, INC., FAIRMONT, MINNESOTA

PUTTING YOUR FINGER ON FACTS!

The faster you get the facts, the better prepared you are to make wise decisions.

Across the nation, organizations are getting accounting and statistical facts *when* they want them and in the form they want them . . . because they use IBM Electronic Business Machines.

These machines have proved invaluable for the accounting and statistical requirements of railroads and other major industries.



IBM
TRADE MARK

INTERNATIONAL BUSINESS MACHINES
590 Madison Avenue, New York 22, N. Y.

(*Continued from page 74*)

with events and personalities in the road's history and, although they are "light" reading, they manage to cover a lot of factual history which might otherwise be known only to more serious students of the road. Clever line drawings add visual interest to each chapter. Over 100,000 copies are being distributed to the general public at the I.C.'s local centennial celebrations, and to schools, colleges, newspapers and public libraries throughout the country. Departments of the railroad have also distributed copies to friends and associates in outside fields and copies are furnished to employees who request them.

Canned Goods Survey, Packaging, Handling, Transportation. 39 pages, illustrations. Sponsored by the California Terminal Railroads in cooperation with the Association of American Railroads. Copies available from A.A.R. Freight Claim Division, 59 E. Van Buren st., Chicago 5.

Late in 1950, the Southern Pacific, the Western Pacific, the Santa Fe and the Union Pacific instituted this survey with representatives of the Freight Claim Division and the Freight Loading & Container Section of the A.A.R. to determine the extent of several known canned goods damage factors and means of correcting them. Some 70 individual food canning firms in California cooperated.

All phases of intraplant handling that contribute to body and rim damage of cans (two major claim sources that are difficult to track down) are detailed in the initial section of the booklet. The next section deals with storage, handling, filling, sealing and loading of corrugated fiberboard containers for canned goods. It recommends a number of different loading methods for through and stop-off cars, for cars of mixed-size containers, for loading in refrigerator cars, etc., and points out how damage results for some loading methods which, at the time of loading, might seem perfectly acceptable. Numerous diagrams help clarify the differences in these loading methods, pointing out why some of them are damage-prone.

In another portion of the survey, some 83 corrugated fiberboard boxes were taken from various canning plants and subjected to tests for strength, moisture content, etc.; the results of these tests are related in a third section of the booklet. The final section is devoted to a brief summary of operating conditions faced by the four sponsoring roads in handling canned goods traffic.

Copies of the booklet have been distributed to canners throughout the country and to appropriate personnel on A.A.R. member roads. An illustration of loading methods, typical of the material in this pamphlet, was reproduced on page 44 of the August 6 *Railway Age*.

Bulletin No. 82, Railway & Locomotive Historical Society, 86 pages, illustrations. R. & L. H. S., Baker Library, Harvard Business School, Boston, Mass. $1 to members; $2 to non-members.

A well-illustrated article on the gravity railroad of the Delaware & Hudson Canal Co. leads off this bulletin. It is based on a paper written by John Torrey of Honesdale, Pa., in 1892; the book, "A Century of Progress," published by the D. & H. in 1923; and other data collected by the author, G. M. Best. An article on the Peoria & Oquawka brings to a close the series of papers on the formation of the present Burlington system, and another completes the series on the railroads of McKean county, Pa. Other articles cover a railfan's trip afoot over the Hampden (in Massachusetts)—a railroad which never possessed either motive power or rolling stock and which never moved a revenue train; Virginia antebellum railroad equipment; the Boston and Mt. Desert Limited; and a query concerning the parentage of an early American locomotive.

TRADE PUBLICATION

Tables of Multiple Lengths. 72 pages. United States Steel Corporation subsidiaries, Room 4284, 525 William Penn Place Bldg., Pittsburgh 30, Pa. Free.

This booklet has been prepared to help steel users get the most out of available steels and to help minimize waste. The tables can be used to determine the exact size of any given number of lengths that can be cut from a longer length. The tables are compiled on the basis of dead lengths and make no allowance for loss of material in recutting.

GOVERNMENT OF PAKISTAN
MINISTRY OF COMMUNICATIONS
(RAILWAY DIVISION)

Tender Notice

Tenders are invited for the supply of 10 broad gauge (5'-6") Diesel Electric Locomotives for the North Western Railway, (Pakistan).

2. Tender documents, including instructions to tenderers, Tender Form, Schedule of Requirements; Specifications and Conditions of Contract can be obtained from the Office of the Commercial Counselor, Embassy of Pakistan, Commercial Division, 2315 Massachusetts Avenue, N. W., Washington, D. C., on payment of $30 perset which amount will not be refunded.

3. Tenders will only be considered from those diesel electric locomotive manufacturers who have built diesel electric locomotives of the power and size required and which have been in service on railways and proved successful. Tenders from firms who do not fulfill these conditions will not be considered.

4. Tenders in sealed covers superscribed "TENDERS FOR BROAD GAUGE (5'-6") DIESEL ELECTRIC LOCOMOTIVES" must reach the office of the Director General (Railways), Railway Division, Ministry of Communications, Government of Pakistan, Karachi by 12 noon on 1st November, 1951. They will be opened in the office of the Director, Mechanical Engineering and Stores, Railway Division, Ministry of Communications, Government of Pakistan, (Old Sind P.W.D. Building, Block No. 6-A, Room No. 27) KARACHI at 11 hours on 3rd November 1951, in the presence of any tenderer who may desire to be present.

5. The Government of Pakistan does not bind itself to accept the lowest or any tender and reserves to itself the right tc reject any tender without assigning reasons therefor.

6. This call for tenders is being made simultaneously in Karachi, London, and Washington.

(T. G. Creighton)
for Director General, Railways.

GOVERNMENT OF PAKISTAN
MINISTRY OF COMMUNICATIONS
(RAILWAY DIVISION)

TENDER NOTICE

Tenders are invited for the supply of 13 Metre Gauge (3'-3⅜") Diesel Shunting Locomotives of 350-400 Horse Power for the Eastern Bengal Railway (Pakistan).

2. Tender documents, including instructions to tenderers, Tender Form, Schedule of Requirements; Specifications and Conditions of Contract can be obtained from the Office of the Commercial Counselor, Embassy of Pakistan, Commercial Division, 2315 Massichusetts Avenue, N. W., Washington, D. C., on payment of $30 perset which amount will not be refunded.

3. Tenders in sealed covers superscribed "TENDERS FOR 13 METRE GAUGE (3'-3⅜") DIESEL SHUNTING LOCOMOTIVES" must reach the office of the Director General (Railways), Railway Division, Ministry of Communications, Government of Pakistan, Karachi by 12 noon on 27th October, 1951. They will be opened in the office of the Director of Mechanical Engineering and Stores, Railway Division, Government of Pakistan, (Old Sind P.W.D. Building, Block No. 6-A, Room No. 27) at 11 hours on 29th October, 1951 in the presence of any tenderer who may desire to be present.

4. The Government of Pakistan does not bind itself to accept the lowest or any tender and reserves to itself the right to reject any tender without assigning reasons therefor.

5. This call for tenders is being made simultaneously in Karachi, London and Washington.

(T. G. Creighton)
for Director-General, Railways.

Freight Operating Statistics of Large Steam Railways — Selected

	Region, Road and Year		Miles of road operated	Locomotive-Miles: Train-miles	Locomotive-Miles: Principal and helper	Locomotive-Miles: Light	Car Miles: Loaded (*thousands*)	Car Miles: Per cent loaded	Ton-Miles (*thousands*): Gross excl. locos. & tenders	Ton-Miles (*thousands*): Net rev. and non-rev.	Road locos. on line: Serviceable: Unstored	Road locos. on line: Serviceable: Stored	Road locos. on line: B.O.	Road locos. on line: Per Cent B.O.
New Eng. Region	Boston & Maine	1951	1,691	267,042	274,212	12,600	10,512	71.3	651,826	280,200	86	6	8	8.0
		1950	1,700	265,276	273,343	12,343	10,534	70.4	642,779	270,536	86	3	15	14.4
	N. Y., N. H. & Htfd.	1951	1,766	307,406	307,676	20,455	11,774	68.5	753,268	330,854	97	..	8	7.6
		1950	1,771	296,405	296,728	30,117	11,586	68.0	717,922	320,049	112	..	11	8.9
Great Lakes Region	Delaware & Hudson	1951	793	246,021	285,009	22,153	10,852	74.6	743,796	407,699	124	18	23	13.9
		1950	794	239,746	286,904	28,722	10,448	71.5	719,482	385,455	135	36	26	13.2
	Del., Lack. & Western	1951	964	275,289	296,534	30,509	12,602	70.8	830,262	388,178	81	9	7	7.2
		1950	965	268,399	288,529	31,174	12,075	70.1	791,870	364,066	84	4	31	26.1
	Erie	1951	2,245	616,346	626,847	32,207	33,784	68.0	2,139,439	884,315	177	34	22	9.4
		1950	2,231	646,439	669,585	44,133	33,716	67.6	2,148,421	870,573	190	1	36	15.9
	Grand Trunk Western	1951	952	253,266	256,981	2,778	8,668	65.8	575,188	245,465	50	..	15	23.1
		1950	971	271,871	277,909	2,489	9,583	63.0	654,487	273,727	53	1	12	18.2
	Lehigh Valley	1951	1,211	243,862	254,742	18,903	12,330	70.7	833,328	406,430	37	5	5	10.6
		1950	1,238	239,568	253,033	24,714	11,562	70.4	773,001	370,242	52	4	24	30.0
	New York Central	1951	10,675	2,952,342	3,135,851	175,069	111,364	63.9	7,907,446	3,661,493	979	81	364	25.6
		1950	10,691	3,023,771	3,183,842	185,129	111,580	63.1	7,739,466	3,449,749	996	70	367	25.6
	New York, Chic. & St. L.	1951	2,161	777,095	798,578	12,983	31,360	67.6	2,175,461	997,006	211	10	30	12.0
		1950	2,162	724,711	741,873	11,526	28,817	65.9	1,957,680	861,781	207	1	40	16.1
	Pitts. & Lake Erie	1951	221	98,279	100,752	34	4,282	72.4	353,471	223,195	30	..	11	26.8
		1950	221	90,501	93,811	78	3,897	68.0	328,467	202,351	30	..	16	34.8
	Wabash	1951	2,381	525,579	530,791	8,525	22,258	70.6	1,404,170	592,054	123	13	78	36.4
		1950	2,381	587,927	596,126	9,537	23,267	68.6	1,471,833	583,979	152	4	56	26.4
Central Eastern Region	Baltimore & Ohio	1951	6,083	1,723,495	2,003,352	216,935	69,975	65.4	5,295,320	2,707,993	632	119	172	18.6
		1950	6,086	1,833,621	2,202,059	231,907	67,104	64.9	4,894,267	2,380,491	695	40	145	25.0
	Central of New Jersey	1951	410	72,512	72,666	3,527	2,892	66.4	216,454	112,874	39	..	2	4.9
		1950	410	71,778	73,528	5,403	2,830	65.0	213,354	111,976	35	1	6	14.3
	Central of Pennsylvania	1951	210	70,945	78,127	12,240	2,804	70.5	201,362	109,470	26	2	6	17.6
		1950	212	70,830	79,123	14,177	2,882	69.7	205,828	111,984	38	..	19	33.3
	Chicago & Eastern Ill.	1951	886	127,236	127,236	3,519	4,944	70.5	319,059	156,096	28	..	1	3.4
		1950	886	126,358	126,358	2,306	4,503	69.0	280,103	127,507	23	..	..	..
	Elgin, Joliet & Eastern	1951	238	98,588	99,606	272	3,420	60.1	311,758	168,109	43	..	..	..
		1950	238	97,314	97,705	....	3,628	67.6	280,157	154,194	38	..	2	5.0
	Pennsylvania System	1951	10,045	3,336,161	3,616,534	380,063	144,492	67.0	10,219,065	5,104,364	1,234	107	280	17.3
		1950	10,042	3,175,910	3,476,926	394,082	135,824	66.9	9,600,716	4,781,609	1,268	..	380	23.1
	Reading	1951	1,311	369,593	382,616	30,945	14,554	68.8	1,118,724	623,820	181	14	24	11.0
		1950	1,315	358,022	369,688	28,073	13,706	67.8	1,043,569	571,628	172	25	26	11.7
	Western Maryland	1951	837	182,989	216,551	25,589	6,734	66.5	537,786	304,731	128	5	18	11.9
		1950	837	178,320	206,946	22,506	6,305	63.9	508,386	282,782	137	31	12	6.7
Pocahontas Region	Chesapeake & Ohio	1951	5,042	1,448,269	1,517,055	64,023	67,879	58.8	5,812,718	3,293,549	474	11	265	35.3
		1950	5,045	1,424,171	1,504,480	61,717	61,241	59.5	5,078,735	2,820,096	495	39	143	21.1
	Norfolk & Western	1951	2,113	747,752	796,276	60,523	36,058	59.7	3,171,460	1,745,912	251	17	14	5.0
		1950	2,107	669,068	700,273	42,636	31,493	60.1	2,720,058	1,481,932	230	34	33	11.1
Southern Region	Atlantic Coast Line	1951	5,434	893,976	895,631	13,047	27,791	63.2	1,889,292	846,647	371	24	123	23.7
		1950	5,480	789,961	791,361	11,696	23,348	63.3	1,557,352	682,256	304	24	80	19.6
	Central of Georgia	1951	1,765	261,747	263,376	4,225	7,554	69.9	489,853	228,507	107	5	13	10.4
		1950	1,783	270,932	276,084	4,843	7,348	73.7	455,878	214,100	99	2	11	9.8
	Gulf, Mobile & Ohio	1951	2,851	322,078	322,078	205	16,033	70.0	1,058,296	496,396	81	..	2	2.4
		1950	2,851	316,528	316,528	215	14,343	69.8	920,632	415,287	61	..	2	3.2
	Illinois Central	1951	6,539	1,487,333	1,492,538	51,697	51,972	62.9	3,755,498	1,731,778	561	41	62	9.3
		1950	6,543	1,453,485	1,456,373	52,093	52,275	65.1	3,664,870	1,691,841	545	18	93	14.2
	Louisville & Nashville	1951	4,769	1,075,297	1,146,186	31,693	35,845	65.0	2,614,810	1,331,628	320	27	87	20.0
		1950	4,770	1,137,782	1,220,702	34,993	35,166	64.1	2,583,494	1,311,241	347	24	107	22.4
	Nash., Chatt. & St. Louis	1951	1,049	198,765	201,122	4,184	6,144	75.4	384,983	185,558	56	..	5	8.2
		1950	1,049	207,172	209,432	3,775	6,129	75.2	367,696	167,949	69	..	1	1.4
	Seaboard Air Line	1951	4,136	758,940	765,096	5,903	26,147	65.5	1,791,216	799,290	212	68	49	14.9
		1950	4,136	730,538	751,530	3,771	23,779	66.5	1,594,201	698,030	289	28	30	8.6
	Southern	1951	6,302	1,166,299	1,173,020	12,518	39,779	70.5	2,523,435	1,162,914	374	31	184	31.2
		1950	6,320	1,177,739	1,185,890	12,658	38,884	69.1	2,492,967	1,134,587	371	35	182	31.0
Northwestern Region	Chicago & North Western	1951	7,910	880,288	894,097	24,019	33,319	67.9	2,345,926	1,049,550	314	19	136	29.0
		1950	7,998	860,674	870,981	19,764	31,708	65.5	2,220,085	919,532	298	15	95	23.6
	Chicago Great Western	1951	1,441	140,864	140,864	7,355	7,944	68.5	535,980	245,385	31	..	1	3.1
		1950	1,441	122,428	122,428	5,243	6,697	71.0	429,825	194,306	33	..	1	2.9
	Chic., Milw., St. P. & Pac.	1951	10,664	1,149,578	1,186,770	44,268	45,069	67.7	3,056,399	1,428,513	413	82	69	12.2
		1950	10,663	1,187,693	1,225,640	44,034	45,138	68.7	2,951,895	1,340,863	429	54	73	13.1
	Chic., St. P., Minn. & Omaha	1951	1,606	189,242	194,132	7,953	5,609	68.3	382,238	169,955	69	1	29	29.3
		1950	1,606	181,191	188,290	9,376	5,503	72.5	356,455	159,741	74	1	37	33.0
	Duluth, Missabe & Iron Range	1951	566	216,790	218,238	2,115	9,427	50.8	1,044,602	618,627	65	..	8	11.0
		1950	563	166,272	167,224	1,297	8,393	50.7	861,369	524,647	49	..	2	3.9
	Great Northern	1951	8,220	1,024,233	1,025,905	39,596	43,416	66.5	3,275,985	1,709,813	357	81	49	10.1
		1950	8,220	498,773	847,359	36,931	36,524	64.1	2,717,475	1,351,669	342	76	50	10.7
	Minneap., St. P. & S. Ste. M.	1951	4,179	415,109	423,562	5,616	15,098	65.2	1,067,956	526,064	113	..	18	13.7
		1950	4,179	403,353	408,716	5,397	13,731	68.1	912,181	438,693	107	..	15	12.3
	Northern Pacific	1951	6,591	760,502	787,571	37,927	31,781	72.1	2,185,909	1,090,383	325	26	63	15.2
		1950	6,608	767,573	805,754	41,424	32,006	68.2	2,198,125	1,023,296	306	24	64	16.2
Central Western Region	Atch., Top. & S. Fe (incl. G. C. & S. F. and P. & S. F.)	1951	13,097	2,669,390	2,824,474	111,882	111,881	65.8	7,582,502	2,901,807	682	38	138	16.1
		1950	13,073	2,742,446	2,890,124	128,256	116,328	64.3	7,969,058	2,880,827	654	117	107	12.2
	Chic., Burl. & Quincy	1951	8,788	1,131,023	1,137,114	38,106	46,668	67.3	3,184,670	1,484,866	326	56	119	23.8
		1950	8,797	1,083,920	1,091,490	40,562	44,753	69.1	2,954,764	1,361,850	348	53	160	28.5
	Chic., Rock I. & Pac.	1951	7,903	1,043,011	1,056,336	16,768	36,548	63.9	2,492,910	1,089,369	268	14	41	12.7
		1950	7,597	866,422	890,289	12,931	30,500	61.2	2,029,798	860,114	228	24	79	23.9
	Denver & R. G. Wn.	1951	2,334	303,860	329,375	33,755	14,232	72.3	978,269	476,934	93	41	31	18.8
		1950	2,413	277,252	299,786	25,794	10,497	74.0	678,625	344,659	106	41	33	18.3
	Southern Pacific	1951	8,052	2,302,336	2,432,805	310,247	101,519	66.0	6,833,944	2,708,224	732	5	137	15.7
		1950	8,069	2,426,347	2,616,520	389,679	104,197	61.9	7,195,523	2,681,128	766	8	153	16.5
	Union Pacific	1951	9,712	2,158,709	2,248,162	155,763	95,302	68.9	6,407,786	2,885,706	559	62	151	19.6
		1950	9,719	2,221,055	2,317,087	170,543	98,315	67.0	6,680,490	2,789,911	542	52	170	22.3
	Western Pacific	1951	1,190	219,106	223,814	15,688	11,123	76.6	692,199	327,935	49	12	30	33.0
		1950	1,192	170,731	174,078	11,791	8,443	75.7	524,678	240,680	59	12	24	25.3
Southwestern Region	International-Gt. Northern*	1951	1,104	193,628	193,773	672	6,333	64.7	464,046	215,283	46	..	12	20.7
		1950	1,089	178,194	178,422	1,087	5,492	62.1	421,564	196,758	58	5	6	8.7
	Kansas City Southern	1951	886	161,607	161,615	524	8,815	69.3	587,492	275,660	29	13	23	35.4
		1950	886	142,330	143,199	666	7,618	67.8	513,341	235,594	35	8	13	23.2
	Mo.-Kans.-Texas Lines	1951	3,230	368,971	371,760	5,867	13,685	65.5	883,427	380,582	78	9	32	26.9
		1950	3,231	447,196	453,849	6,314	15,552	64.3	1,023,736	434,964	102	..	33	24.4
	Missouri Pacific*	1951	6,942	1,256,115	1,278,056	16,804	47,602	67.6	3,192,719	1,443,541	338	26	64	15.0
		1950	6,949	1,207,430	1,224,478	22,672	43,715	68.4	2,860,875	1,271,614	342	3	60	14.8
	Texas & Pacific	1951	1,844	369,640	369,640	5,721	14,737	63.2	1,020,745	377,228	98	2	..	..
		1950	1,844	374,947	374,947	18,561	14,584	63.9	989,783	355,160	77	..	5	6.1
	St. Louis-San Francisco	1951	4,570	642,797	646,066	6,974	22,800	64.0	1,566,053	696,220	208	72	95	25.3
		1950	4,604	679,358	687,061	6,665	22,092	66.0	1,479,100	659,863	216	74	64	18.1
	St. Louis Southw. Lines	1951	1,562	380,735	382,095	5,223	15,987	73.0	968,056	432,734	79	9	15	14.6
		1950	1,562	329,767	330,602	4,545	14,451	73.8	850,694	380,272	72	13	18	17.5
	Texas & New Orleans	1951	4,291	750,808	751,040	13,629	26,310	69.3	1,744,491	772,505	224	..	46	17.0
		1950	4,314	798,988	798,988	14,407	24,819	62.2	1,723,679	717,679	207	..	64	23.6

Items for the Month of June 1951 Compared with June 1950

Region, Road and Year		Freight cars on line: Home	Foreign	Total	Per Cent B.O.	G.t.m.per train-hr. excl.locos and tenders	G.t.m.per train-mi. excl.locos. and tenders	Net ton-mi. per train-mile	Net ton-mi. per l'd. car-mile	Net ton-mi. per car-day	Car-miles per car-day	Net daily ton-mi. per road-mi.	Train-miles per train-hour	Miles per loco. per day
New Eng. Region	Boston & Maine	1951	1,239	9,001	10,240	1.9	38,110	2,445	1,051	26.7	884	46.5	5,523	15.6	103.3
		1950	1,660	9,140	10,800	4.0	37,671	2,427	1,022	25.7	819	45.3	5,305	15.5	97.7
	N. Y., N. H. & Htfd.	1951	1,429	16,602	18,031	2.9	36,745	2,452	1,077	28.1	593	30.8	6,245	15.0	118.6
		1950	1,704	17,054	18,758	1.7	34,898	2,425	1,081	27.6	544	29.0	6,024	14.4	100.0
Great Lakes Region	Delaware & Hudson	1951	2,124	6,593	8,717	7.0	56,843	3,038	1,665	37.6	1,579	54.6	17,137	18.8	65.2
		1950	2,896	7,141	10,037	5.3	54,260	3,017	1,616	36.9	1,311	49.7	16,182	18.1	57.7
	Del., Lack. & Western	1951	4,626	11,601	16,227	7.0	46,087	3,073	1,437	30.8	810	37.1	13,422	15.3	120.3
		1950	6,297	11,065	17,362	10.8	43,584	3,008	1,383	30.2	693	32.8	12,576	14.8	100.6
	Erie	1951	6,394	23,734	30,128	3.2	59,641	3,508	1,450	26.2	1,010	56.7	13,130	17.2	104.4
		1950	8,773	22,078	30,851	5.9	56,742	3,342	1,354	25.8	934	53.5	13,007	17.1	117.3
	Grand Trunk Western	1951	3,693	9,659	13,352	5.3	45,854	2,286	976	28.3	616	33.1	8,595	20.2	141.2
		1950	4,196	11,188	15,384	5.6	48,380	2,433	1,017	28.6	568	31.6	9,397	20.1	149.1
	Lehigh Valley	1951	2,572	13,152	15,724	6.2	66,597	3,481	1,698	33.0	873	37.5	11,187	19.5	195.6
		1950	3,916	10,937	14,853	8.4	62,088	3,294	1,578	32.0	816	36.2	9,969	19.2	116.0
	New York Central	1951	50,494	121,612	172,106	5.0	45,612	2,720	1,259	32.9	689	32.8	11,433	17.0	86.1
		1950	60,996	105,854	166,850	8.3	43,663	2,599	1,158	30.9	688	35.3	10,756	17.1	87.3
	New York, Chic. & St. L.	1951	5,668	21,632	27,300	3.2	50,084	2,858	1,310	31.8	1,250	58.2	15,379	17.9	115.9
		1950	5,746	20,556	26,302	4.0	49,618	2,748	1,210	29.9	1,086	55.2	13,287	18.4	110.3
	Pitts. & Lake Erie	1951	3,729	13,606	17,335	8.5	52,852	3,609	2,279	52.1	444	11.8	33,664	14.7	85.8
		1950	4,893	11,258	16,151	15.4	50,201	3,634	2,239	51.9	437	12.4	30,521	13.8	70.3
	Wabash	1951	6,785	13,678	20,463	4.1	57,444	2,698	1,137	26.6	1,002	53.4	8,289	21.5	89.7
		1950	6,483	13,651	20,134	3.4	53,204	2,525	1,002	25.1	985	57.2	8,176	21.3	103.8
Central Eastern Region	Baltimore & Ohio	1951	44,556	63,434	107,990	5.3	42,290	3,110	1,591	38.7	852	33.6	14,839	13.8	83.8
		1950	33,446	50,909	84,355	11.5	36,009	2,721	1,323	35.5	914	39.7	13,038	13.5	83.8
	Central of New Jersey	1951	356	8,983	9,339	2.9	38,412	3,098	1,615	39.0	399	15.4	9,177	12.9	93.8
		1950	761	8,745	9,506	7.8	39,709	3,085	1,619	39.6	367	14.3	9,104	13.4	93.0
	Central of Pennsylvania	1951	1,581	3,802	5,383	16.8	43,727	3,050	1,658	39.0	742	27.0	17,376	15.4	101.9
		1950	1,128	4,544	5,672	8.8	41,166	3,089	1,680	38.9	750	27.7	17,608	14.2	70.6
	Chicago & Eastern Ill.	1951	1,496	3,096	4,592	10.9	43,204	2,513	1,229	31.6	1,131	50.8	5,872	17.2	167.7
		1950	2,026	3,853	5,879	7.3	40,742	2,218	1,010	28.3	708	36.2	4,797	18.4	175.1
	Elgin, Joliet & Eastern	1951	5,888	14,600	20,488	2.0	21,865	3,255	1,755	49.2	274	9.3	23,545	6.9	109.8
		1950	6,432	12,560	18,992	1.4	22,570	2,956	1,627	42.5	264	9.2	21,596	7.8	108.4
	Pennsylvania System	1951	95,420	119,003	214,423	8.9	46,844	3,168	1,582	35.3	800	33.8	16,938	15.3	90.1
		1950	102,687	123,943	226,630	14.4	45,021	3,127	1,558	35.2	720	30.6	15,872	14.9	85.6
	Reading	1951	10,015	22,507	32,522	3.9	38,183	3,029	1,689	42.9	663	22.5	15,861	12.6	73.7
		1950	10,851	21,080	31,931	8.5	36,761	2,915	1,597	41.7	600	21.2	14,490	12.6	68.8
	Western Maryland	1951	3,889	3,461	7,350	2.7	43,147	2,984	1,691	45.3	1,289	42.8	12,136	14.7	58.2
		1950	3,496	3,168	6,664	1.9	41,125	2,916	1,622	44.9	1,298	45.3	11,262	14.4	44.2
Pocahontas Region	Chesapeake & Ohio	1951	50,019	26,517	76,536	4.2	67,536	4,054	2,297	48.5	1,415	49.6	21,774	16.8	75.6
		1950	47,380	31,402	78,782	6.2	60,108	3,606	2,002	46.0	1,189	43.4	18,633	16.9	81.2
	Norfolk & Western	1951	27,912	8,316	36,228	2.3	71,396	4,316	2,376	48.4	1,551	53.6	27,542	16.8	108.5
		1950	22,759	7,240	29,999	2.8	66,343	4,109	2,239	47.1	1,524	53.9	23,445	16.3	87.7
Southern Region	Atlantic Coast Line	1951	10,475	18,917	29,392	2.4	33,950	2,123	951	30.5	944	49.0	5,194	16.1	66.3
		1950	10,654	15,512	26,166	3.5	30,754	1,978	866	29.2	833	45.0	4,150	15.6	69.5
	Central of Georgia	1951	1,909	5,902	7,811	3.0	33,474	1,879	877	30.2	1,029	48.7	4,316	17.9	74.7
		1950	2,374	5,060	7,434	5.8	30,678	1,689	793	29.1	998	46.5	4,003	18.2	90.4
	Gulf, Mobile & Ohio	1951	3,141	10,774	13,915	3.7	63,834	3,295	1,545	31.0	1,219	56.6	5,804	19.4	138.3
		1950	3,582	10,743	14,325	3.2	57,557	2,917	1,316	29.0	980	48.4	4,855	19.8	170.1
	Illinois Central	1951	22,124	32,142	54,266	1.9	46,497	2,558	1,180	33.3	1,081	51.6	8,828	18.4	82.9
		1950	19,642	30,796	50,438	2.6	46,412	2,553	1,179	32.4	1,144	54.3	8,619	18.4	82.1
	Louisville & Nashville	1951	26,280	15,391	41,671	10.8	38,901	2,439	1,242	37.1	988	40.9	9,308	16.0	97.7
		1950	28,907	14,043	42,950	12.4	35,908	2,278	1,156	37.3	948	39.6	9,163	15.8	94.9
	Nash., Chatt. & St. Louis	1951	1,010	4,561	5,571	3.5	38,525	1,944	937	30.2	1,099	48.3	5,986	19.9	107.3
		1950	2,105	4,687	6,792	4.1	35,841	1,782	814	27.4	843	40.9	5,338	20.2	115.7
	Seaboard Air Line	1951	8,806	13,893	22,699	2.0	43,444	2,407	1,074	30.6	1,108	55.3	6,442	18.4	88.8
		1950	8,372	13,584	21,956	1.7	38,647	2,233	978	29.4	1,033	52.9	5,626	17.7	82.9
	Southern	1951	12,373	27,895	40,268	4.3	37,281	2,174	1,002	29.2	959	46.5	6,151	17.2	72.8
		1950	13,541	26,410	39,951	2.8	36,427	2,130	969	29.2	954	47.3	5,984	17.2	73.6
Northwestern Region	Chicago & North Western	1951	17,192	30,678	47,870	4.2	42,490	2,795	1,250	31.5	739	34.6	4,423	15.9	71.4
		1950	19,203	36,536	55,739	3.0	41,348	2,675	1,108	29.0	573	30.2	3,832	16.0	76.0
	Chicago Great Western	1951	1,359	5,956	7,315	2.5	64,599	3,821	1,750	30.9	1,166	55.2	5,676	17.0	161.6
		1950	1,064	1,815	2,879	7.1	59,839	3,541	1,601	29.0	1,387	67.3	4,495	17.0	131.7
	Chic., Milw., St. P. & Pac.	1951	30,070	33,258	63,328	4.4	44,886	2,675	1,250	31.7	736	34.3	4,465	16.9	78.2
		1950	27,188	36,968	64,156	2.9	41,041	2,506	1,139	29.7	723	35.4	4,192	16.5	81.5
	Chic., St. P., Minn. & Omaha	1951	1,074	8,335	9,409	2.8	29,270	2,102	935	30.3	618	29.9	3,528	14.5	75.7
		1950	1,065	8,700	9,765	2.8	26,787	2,005	898	29.0	593	28.2	3,316	13.6	65.5
	Duluth, Missabe & Iron Range	1951	13,330	2,221	15,551	2.3	88,533	5,002	2,962	65.6	1,346	40.4	36,433	18.4	121.2
		1950	13,639	1,095	14,734	3.2	90,120	5,431	3,308	62.5	1,204	38.0	31,063	17.4	131.7
	Great Northern	1951	24,524	17,905	42,429	3.3	48,881	3,242	1,692	39.4	1,295	49.4	6,934	15.3	80.5
		1950	23,753	17,954	41,707	3.1	48,336	3,243	1,613	37.0	1,050	44.3	5,481	15.1	68.9
	Minneap., St. P. & S. Ste. M.	1951	6,675	9,409	16,084	5.6	44,838	2,595	1,278	34.8	1,115	49.0	4,196	17.4	120.5
		1950	6,306	8,399	14,705	6.1	41,868	2,281	1,097	31.9	985	45.3	3,499	18.5	125.9
	Northern Pacific	1951	19,168	16,401	35,569	5.3	48,360	2,888	1,441	34.3	1,000	40.4	5,515	16.8	73.0
		1950	19,057	16,550	35,607	7.5	48,779	2,888	1,344	32.0	1,010	46.3	5,162	17.0	77.7
Central Western Region	Atch., Top. & S. Fe (incl. G. C. & S. F. and P. & S. F.)	1951	51,420	37,672	89,092	4.1	58,434	2,858	1,094	25.9	1,097	64.2	7,385	20.6	120.0
		1950	46,016	36,317	82,333	4.8	59,266	2,923	1,057	24.8	1,208	75.8	7,345	20.4	119.9
	Chic., Burl. & Quincy	1951	16,928	25,133	42,061	3.8	54,344	2,827	1,318	31.8	1,191	55.6	5,632	19.3	81.3
		1950	16,843	26,585	43,428	3.8	52,144	2,736	1,261	30.4	1,086	51.6	5,160	19.1	70.5
	Chic., Rock I. & Pac.	1951	9,726	25,994	35,720	3.6	44,511	2,396	1,047	29.8	1,027	53.9	4,595	18.6	117.2
		1950	7,604	6,041	13,645	7.3	43,699	2,356	998	28.2	1,223	70.8	3,774	18.7	94.1
	Denver & R. G. Wn.	1951	7,926	4,843	12,769	4.1	56,495	3,228	1,574	33.5	1,246	51.4	6,811	17.5	78.1
		1950	6,944	1,880	8,824	10.3	44,720	2,477	1,258	32.8	1,025	42.2	4,761	18.3	64.3
	Southern Pacific	1951	24,856	49,827	74,683	3.1	48,753	3,008	1,192	26.7	1,154	65.6	11,211	16.4	112.4
		1950	26,087	51,012	77,099	2.6	46,616	3,002	1,118	25.7	1,194	75.0	11,076	15.7	116.4
	Union Pacific	1951	34,727	32,896	67,623	2.9	66,626	3,004	1,353	30.3	1,433	68.6	9,904	22.4	105.8
		1950	26,059	35,977	62,036	2.3	68,084	3,049	1,273	28.4	1,509	79.4	9,569	22.6	110.2
	Western Pacific	1951	1,727	4,730	6,457	6.0	67,790	3,168	1,501	29.5	1,759	77.9	9,186	21.5	89.5
		1950	1,414	894	2,308	25.8	66,407	3,089	1,417	28.5	2,168	100.5	6,730	21.6	67.1
Southwestern Region	International-Gt. Northern*	1951	716	7,001	7,717	2.6	45,804	2,413	1,119	34.0	918	41.7	6,500	19.1	108.1
		1950	882	6,181	7,063	2.4	46,138	2,387	1,114	35.8	934	42.0	6,023	19.5	91.1
	Kansas City Southern	1951	1,050	5,660	6,710	3.6	70,919	3,646	1,711	31.3	1,345	62.0	10,371	19.5	90.8
		1950	1,190	5,639	6,829	3.0	68,137	3,645	1,673	30.9	1,150	54.9	8,864	18.9	93.8
	Mo.-Kans.-Texas Lines	1951	4,311	5,809	10,120	6.0	46,226	2,401	1,034	27.8	1,281	70.3	3,928	19.3	109.0
		1950	3,326	10,186	13,512	2.4	42,992	2,302	978	28.0	1,072	59.6	4,487	18.8	124.5
	Missouri Pacific*	1951	19,352	18,670	38,022	2.1	52,515	2,558	1,157	30.3	1,298	63.3	6,931	20.7	108.0
		1950	17,113	22,122	39,235	2.0	47,439	2,382	1,059	29.1	1,090	54.8	6,100	20.0	111.8
	Texas & Pacific	1951	2,066	8,993	11,059	4.5	60,715	2,767	1,023	25.6	1,172	72.4	6,819	22.0	123.2
		1950	2,632	8,681	11,313	5.0	54,423	2,644	949	24.4	1,122	72.0	6,420	20.6	172.2
	St. Louis-San Francisco	1951	11,317	11,366	22,683	3.2	41,591	2,442	1,086	30.5	1,005	51.4	5,078	17.1	65.2
		1950	9,242	14,284	23,526	3.2	37,350	2,185	975	29.9	932	47.3	4,777	17.2	72.6
	St. Louis Southw. Lines	1951	1,563	5,840	7,403	1.7	49,471	2,547	1,138	27.1	2,024	102.5	9,235	19.5	136.1
		1950	1,476	5,295	6,771	1.3	51,111	2,581	1,154	26.3	2,017	103.9	8,115	19.8	113.5
	Texas & New Orleans	1951	3,450	15,611	19,061	3.1	44,972	2,342	1,037	29.4	1,324	65.1	6,001	19.4	98.8
		1950	4,062	17,944	22,006	2.5	41,480	2,177	906	28.9	1,121	62.4	5,544	19.2	102.8

*Report of trustee or trustees.

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Advertisers IN THIS ISSUE

The information contained in the advertising pages of Railway Age constitutes an important supplement to the editorial content of this paper. Refer to these ads for the latest advances in equipment, materials and supplies.

A

Adams & Westlake Company, The .. 29
Air Reduction Sales Company 10
American Locomotive Company, Railway Steel-Spring Division 66
American Steel Foundries 19
Association of Manufacturers of Chilled Car Wheels 23

B

Bendix Aviation Corporation, Scintilla Magneto Division 22
Bethlehem Steel Company 3
Bituminous Coal Institute 12
Boyer, R. H. 83
Briggs & Stratton Corporation 71
Budd Company, The 64, 65

C

California Company, The 27
Classified Department 83
Combustion Engineering-Superheater, Inc. 69
Columbia Steel Company 24, 25

D

Differential Steel Car Company 70
Dixie Cup Company 63
Dyer Co., Inc., W. H. 83

E

Edgewater Steel Company 14
Electro-Motive Division, General Motors Corporation 20, 21
Esso Standard Oil Company 61

F

Fairmont Railway Motors, Inc. 75
Frank, M. K. 83

G

General American Transportation Corporation 30
General Electric Company 15
General Railway Signal Company .....Back Cover
Government of Pakistan 77
Graybar Electric Company, Inc. 72
Great Lakes Steel Company 18

H

Hunt Company, Robert W. 83
Hyatt Bearings Division, General Motors Corporation 4

I

International Business Machines 76
International Harvester Company .. 73
Iron & Steel Products, Inc. 83

M

Mancuso 83
Minneapolis Honeywell 26
Mississippi Valley Equipment Co. .. 83
Mortell Co., J. W. 74

N

National Malleable and Steel Castings Company 9
National Steel Corporation 18

P

Permacrete Products Corporation ... 17
Purdy Co., The 82

R

Railway Educational Bureau, The .. 83
Railway Steel-Spring Division, American Locomotive Company .. 66
Read Standard Corporation 82
Reynolds Metals Company 28
Rust-Oleum Corporation 80
Ryerson & Son Inc., Joseph T. 84

S

Scullin Steel Co. 11
Simmons-Boardman Publishing Company 82
Sonken-Galamba Corporation 83
Standard Manifold Company 82
Standard Oil Company of California 27
Standard Oil Company of Texas .. 27
Standard Oil Company (Indiana) .. 81
Standard Railway Equipment Manufacturing Company 13
Superheater Inc.-Combustion Engineering 69
Symington-Gould Corporation, The . 85

T

Tennessee Coal, Iron and Railroad Company 24, 25
Texas Company, The 2
Timken Roller Bearing Company, The .....Front Cover

U

Union Switch & Signal Company .. 6
United States Steel Company 24, 25
United States Steel Export Company 24, 25

V

Vanadium Corporation of America .. 16

W

Westinghouse Air Brake Co. 59

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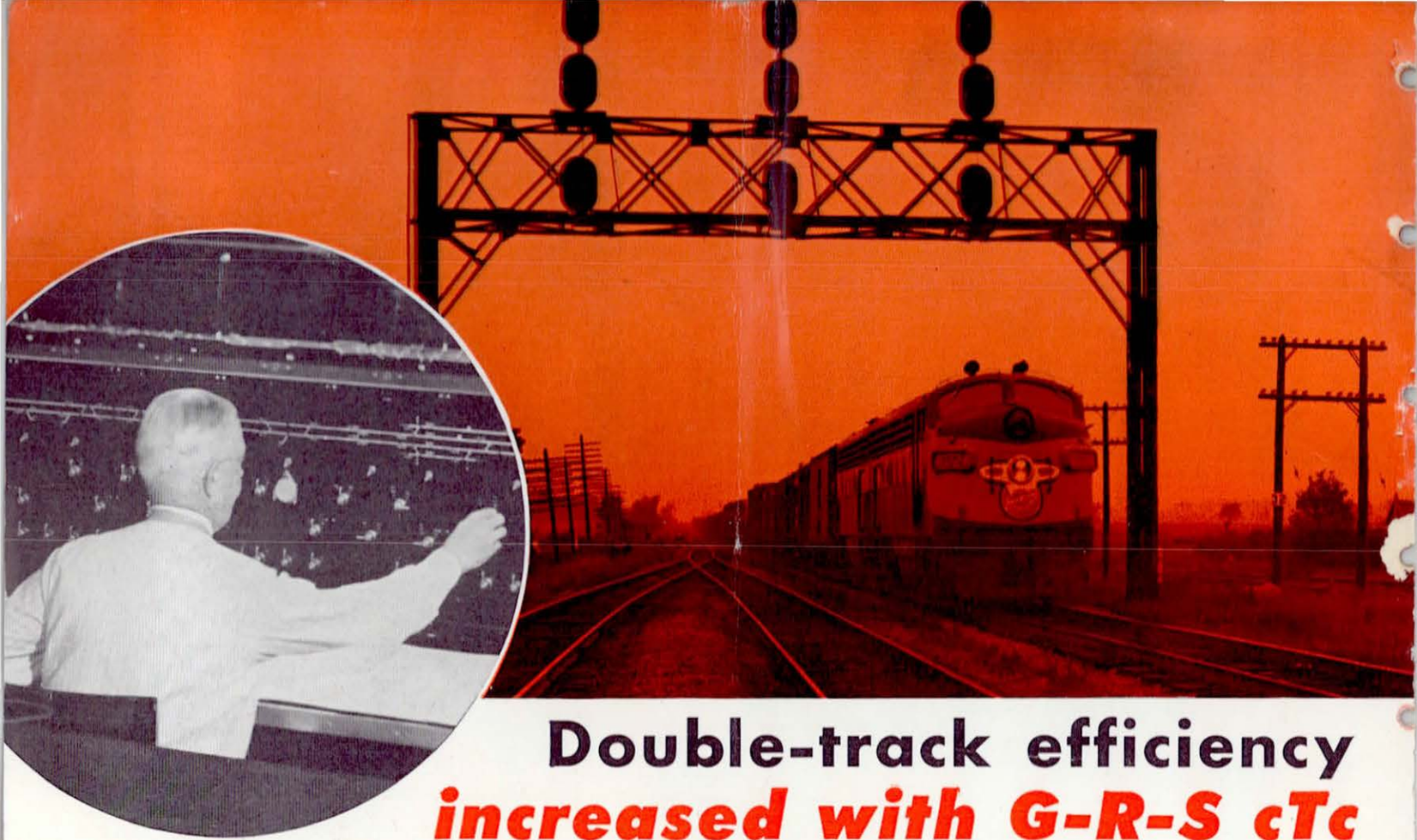

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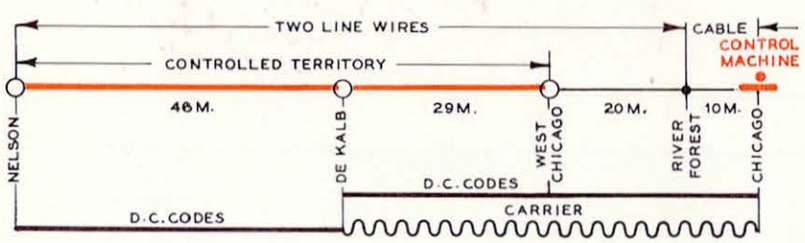

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